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QUALIFICATION AND APPLICATION
SYSTEM AND PROCESS**
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Sir:

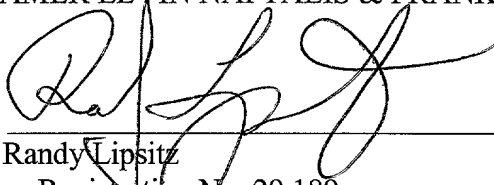
Kindly file the annexed papers indicated below:

- (X) Patent Application
- (X) Informal Drawings (39 Sheets)

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Respectfully submitted,
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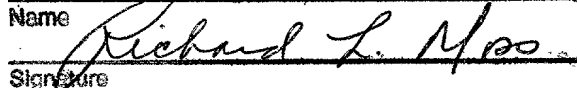
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FOR LETTERS PATENT OF THE UNITED STATES
FOR IMPROVEMENTS IN

**ONLINE MORTGAGE QUALIFICATION AND APPLICATION
SYSTEM AND PROCESS**

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ONLINE MORTGAGE QUALIFICATION AND APPLICATION SYSTEM AND PROCESS

BACKGROUND OF THE INVENTION

The present invention relates generally to a computerized mortgage qualification, application, approval, underwriting and pricing system and process. More particularly, the present invention relates to a system and process that permit a potential borrower to first ascertain the likelihood that the borrower will qualify for a mortgage loan online in real time, and to apply for and obtain a mortgage that has been priced based specifically on the borrower's financial profile and other relevant information.

When considering the purchase or refinance of a home, potential home buyers consult mortgage lenders such as mortgage companies, savings and loans institutions, credit unions, state and local housing finance agencies or the like to obtain the funds necessary to purchase or refinance their homes. These lenders, who make (originate and fund) mortgage loans directly to home buyers, comprise the "primary mortgage market."

When a mortgage is made in the primary mortgage market, the lender has several options which include: (i) holding the loan as an investment in its portfolio; (ii) selling the loan to investors in the "secondary mortgage market" (which includes Fannie Mae, assignee of the present application, pension funds, insurance companies, securities dealers, financial institutions and various other investors) to replenish its supply of funds; or (iii) packaging the loan with other loans and exchanging them for securities like mortgage backed securities which provide lenders with a liquid asset to hold or sell to the secondary market. By choosing to sell its mortgage loans

to the secondary mortgage market, or by selling the mortgage backed securities, lenders get a new supply of funds to make more home mortgage loans, thereby assuring home buyers a continual supply of mortgage credit.

A secondary mortgage market purchaser finances the loans and mortgage backed securities it buys for its own mortgage portfolio by the sale of debt securities in the global capital markets. Working with investment banks, the purchaser sells its debt to both domestic and international investors such as central banks, pension funds, investment funds, commercial banks, and insurance companies.

As a leader in the secondary mortgage market, Fannie Mae's critical role in providing a steady stream of mortgage funds to lenders across the United States has spurred Fannie Mae to develop new systems and methods to make the process of buying a home quicker, easier and less costly. Particularly, the inventors of the present invention perceived a need in the industry for a loan platform that would (i) enable non-traditional players to originate loans without having to build the requisite infrastructure, (ii) streamline the loan process to provide a positive consumer experience, (iii) lower the cost of the loan origination process and reduce the costs and uncertainty associated with managing credit risk, and (iv) create a competitive pricing structure where specific components of the costs and fees associated with the loan may, at the borrower's option, be aggregated or "bundled" with the loan principal.

Accordingly, it is desirable to provide a system and process which provide a potential borrower with (i) a meaningful and readily understandable, real time, anonymous assessment of the likelihood of being approved for a loan based on limited information provided

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by the potential borrower without the need to obtain a credit report or a collateral appraisal, (ii) an online, real time, firm underwriting decision on each loan product offered by the lender for which the borrower is eligible, regardless of whether or not the borrower has identified actual collateral (e.g., real property) for the loan, (iii) the opportunity to aggregate closing costs with the loan principal, (iv) an interest rate and points specific to the potential borrower based on the credit risk to the lender and secondary mortgage market purchaser posed by the borrower in connection with the loan products for which the borrower is eligible, (v) reduced loan fees and costs resulting from requiring only limited appraisal field work or no appraisal field work (or the waiver of certain processing steps based on the purpose of the transaction and the loan product types requested), as appropriate, and (vi) reduced documentation verification requirements. The inventive system and process also minimize the uncertainty faced by the loan originator when dealing with the secondary mortgage market by providing the loan originator with the acquisition price it may expect to receive for an individual loan (not an aggregate of loans) in the secondary market from the secondary mortgage market purchaser.

SUMMARY OF THE INVENTION

Generally speaking, a system and process in accordance with the present invention (i) identifies available loan products (e.g., mortgage loans) to potential borrowers, (ii) underwrites and prices loan products for which such borrowers are eligible based on their specific financial and other relevant characteristics, and (iii) facilitates the sale of mortgage loans to secondary mortgage market purchasers. This is accomplished in real time over the Internet or other global communications network.

the associated cost. Importantly, however, the risk associated with not performing an appraisal is factored into the loan pricing as a per loan adjustment to the interest rate. Also, during the underwriting process, the inventive system determines the criteria for aggregating or bundling closing costs with the loan principal.

In the event that the borrower is not approved for any loans during the underwriting process, the lender is provided with information identifying problem areas with respect to the borrower's loan application and suggested areas for improving the borrower's chances for approval. The borrower may be referred to a help center to receive the benefit of such information and suggestions.

The system according to the present invention calculates interest rate quotes (i.e., percentage interest rates and points) for presentation by the lender to the borrower for all loan products offered by the lender for which the borrower is approved during underwriting. The calculated interest rate quotes are based on the specific financial profile and other relevant characteristics of the particular borrower (drawn from the information provided by the potential borrower and by the credit report and other information obtained by the system), and on the credit risk to the loan originator and secondary mortgage market participant posed by the borrower.

Following underwriting and pricing, the borrower may fix or lock in an interest rate and points, or the borrower may choose to float. If the borrower decides to float, the borrower can request and receive an online, up-to-the-minute interest rate quote that is customized to the borrower.

Another object of the present invention is to provide a streamlined loan process to provide a positive experience for users.

Yet another object of the present invention is to provide a loan system and process which give a potential borrower a meaningful and readily understandable assessment of the likelihood of being approved for a loan in real time, without the need for a credit report or a collateral appraisal.

Still another object of the present invention is to provide a loan system and process which provide a borrower with an online, real time, firm underwriting decision on each loan product offered by the lender for which the borrower is eligible regardless of whether or not the borrower has identified actual collateral for the loan.

A further object of the present invention is to provide a loan system and process which provide a borrower with the opportunity to aggregate closing costs with the loan principal.

A still further object of the present invention is to provide a loan system and process which calculate an interest rate and points specific to the individual potential borrower based on the credit risk to the lender and the secondary mortgage market purchaser posed by the borrower in connection with a specific loan product for which the borrower is eligible.

Yet another object of the present invention is to provide a loan system and process which provide for reduced loan origination costs resulting from requiring only limited appraisal field work or no appraisal field work, as appropriate.

A still further object of the present invention is to provide a loan system and process which provide reduced documentation verification requirements.

An additional object of the present invention is to provide a loan system and process which offer the loan originator an indication of the price it may expect to receive for an individual loan in the secondary mortgage market from the secondary mortgage market purchaser.

It is also an object of the present invention to provide a computerized loan system and process which look up predefined factors so that the calculations required are simpler and the hardware requirements are decreased.

Other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The present invention accordingly comprises the various steps and the relation of one or more of such steps with respect to each of the others, and the system embodies features of construction, combinations of elements, and arrangement of parts which are adapted to effect such steps, all as exemplified in the following detailed disclosure, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a schematic diagram of the system constructed and arranged according to the present invention;

Fig. 2a is a high-level flow chart depicting the process flow according to the present invention;

Figs. 2b - 2u depict exemplary computer display screens illustrating the process flow depicted in Fig. 2a;

Figs. 3a - 3b are flow charts depicting the probable qualification calculation process according to the present invention;

Figs. 4 -13 depict exemplary computer display screens used in connection with the probable qualification calculation process according to the present invention;

Figs. 14a - 14b are flow charts depicting the process interaction of the underwriting engine and the pricing engine according to the present invention;

Fig. 15 is a flow chart depicting the risk-based pricing process according to the present invention;

Fig. 16 is a flow chart depicting the process steps of calculating the customer risk-based price component in connection with the pricing process according to the present invention;

Fig. 17 is a flow chart depicting the process steps of retrieving the risk-based guaranty fee in connection with the pricing process according to the present invention; and

Figs. 18a - 18b are flow charts depicting the process steps of generating a spot price according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is directed to a system and process that provide potential borrowers with the means to first ascertain the likelihood that they will be eligible for a loan (e.g., a mortgage loan) in real time over a global computer network, such as, for example, the Internet, and to apply for, and perhaps obtain, a loan online. Although discussed herein in the

and 34, respectively. Interface 30 is preferably a remote interface coupled to server 28 via a publicly accessible global computer network. A common example of such a network is the Internet.

Users of system 10 include potential borrowers (e.g., home buyers), loan originators, which may be mortgage companies, savings and loans or other lending institutions. Desirably, the loan originators also include prospects in the mortgage lending business.

On a conceptual level, system 10 performs three functions: (i) identifying available loan products to potential borrowers, (ii) evaluating the loan application, and (iii) facilitating the sale of the mortgage loan to the secondary mortgage market purchaser. As described in greater detail hereinafter, the loan product identification function involves (a) calculating sample interest rates for presentation to potential borrowers to entice them to use system 10, and, more importantly, (b) assessing a potential borrower's likelihood of being approved for a loan. The loan application evaluation function of system 10 involves underwriting and pricing the loan based on the potential borrower's specific financial profile and other relevant characteristics. The function of committing or selling the individual loan in the secondary mortgage market involves the determination of a spot price for presentation to the loan originator.

Although functionally distinct, it should be understood that the foregoing three functions preferably overlap when it comes to the flow of data inputs through system 10 in order to avoid requiring the borrower to enter the same core data more than once. For example, information input by the potential borrower and used by probable qualification calculator 20 as

described in greater detail hereinafter can be used to populate the loan application and can be used by underwriting engine 24, pricing engine 22, and collateral assessment module 26 to effect their respective functions within system 10.

Referring now to Fig. 2a, the prospect or other loan originator preferably displays generic interest rates (together with an assumptive rate sheet, i.e., current mortgage rates) on its Internet web site or the like to entice online mortgage shoppers to access the web site (step 50). The generic interest rates ("enticement rates") displayed are not intended to be borrower specific, but are calculated by pricing engine 22 and provided to the loan originator as representative, for example, of interest rates that a "typical" borrower may expect to receive, or rates that a fictitious highly qualified borrower may expect to receive, as described in greater detail hereinafter. Fig. 2b depicts an example of a computer Internet interface screen displaying enticement rates.

Once enticed into accessing the loan originator's web site (step 52), the potential borrower is given the option of proceeding immediately with an online loan application or first determining his/her likelihood of being approved for a loan (decision 54). If the borrower opts to first ascertain the likelihood of being approved for a loan, system 10 preferably provides the potential borrower with an exploratory, self-assessment tool driven by probable qualification calculator software 20, as discussed in greater detail hereinafter.

Unlike conventional Internet mortgage web sites which offer housing affordability calculators, system 10 through its probable qualification calculator software 20 is designed to provide the potential borrower with an anonymous, risk-free and cost-free assessment of the percentage likelihood of approval for a mortgage loan (step 56). This is not a mere affordability

calculation such as is common in conventional mortgage web sites. It should be understood, however, that probable qualification calculator 20 can be provided in tandem with a conventional affordability calculator.

Generally speaking, from the perspective of a potential borrower, there are distinct benefits associated with having probable qualification calculator 20 available for self-assessment purposes prior to undergoing a full online loan approval process. As discussed in greater detail hereinafter, calculator 20 can be utilized anonymously, because personal information about the borrower is not collected and a credit report from a credit reporting agency is not required to estimate the probability of mortgage loan approval. Also, the potential borrower can use calculator 20 without a specific property to evaluate. Furthermore, calculator 20 permits the borrower to compare the probability of approval for different loan “scenarios” by iteratively selecting different combinations of down payment, sales price, liquid assets, income, loan purpose, and mortgage product. Calculator 20 can be used without cost to the potential borrower since neither a credit report nor an appraisal is required for the estimation of an approval probability; rather, the borrower need only provide responses to a short online questionnaire which is designed to take only minutes to complete.

Once the potential borrower has ascertained the likelihood of being approved for a loan, the borrower may elect to terminate his/her online loan session or to proceed with an online loan application (decision 58). If the potential borrower does not wish to proceed with a loan application, the session ends (event 59).

exterior inspection). Also, system 10 preferably obtains the county in which the property is located as well as Metropolitan Statistical Area information for the address (“geocoding”). This information may be used to extract Department of Housing and Urban Development (HUD) median income information to help determine if the borrower could be eligible for alternative loan products. It should be understood that, by performing the address scrubbing and geocoding prior to the underwriting process described below, the actual underwriting and pricing of the loan will process faster.

With the permission of the potential borrower received, system 10 obtains a credit report on the borrower (step 62). Preferably, as discussed in greater detail hereinafter, the borrower’s real estate tradelines (e.g., outstanding mortgages, home equity loans) are extracted from the credit report and provided to the loan originator. They are also displayed to the potential borrower for review and correction/explanation, if necessary.

With all the requisite credit and other information input, the loan application is submitted for underwriting and pricing (step 64), as described in greater detail hereinafter. Generally, underwriting engine 24 determines product eligibility based on preselected/preprogrammed rules. Underwriting engine 24 calls pricing engine 22 for the interest rate and point combination for each loan product.

The product affirmatively selected by the borrower (Figs. 2j and 2k), is desirably underwritten first. Underwriting engine 24 will also underwrite the borrower for all available loan products (decision 65) and determine those products for which the borrower is approved (decision 66). The response to the loan originator is all of the approved products and their

associated interest rate quotes (step 68, Figs. 2p and 2q). It should be appreciated that this allows the borrower to review all of the information, compare loan products and interest rate quotes (e.g., side-by-side), and select the loan that best fits the borrower's needs (step 74, Fig. 2r).

Preferably, during underwriting, underwriting engine 24 also executes a process to determine for each approved product (i) the minimum amount of verification documentation required, (ii) the selected loan underwriting parameters (e.g., maximum loan amount, maximum loan amount for bundling closing costs and minimum refinance amount), and (iii) the maximums and minimums used to tailor the interest rate quote (maximum schedule interest rate and maximum number of points) and maximum interest rate approved for float up to a preselected increase over a current approved rate.

Additionally, during underwriting, underwriting engine 24 executes the collateral assessment module 26 to determine the required level of appraisal field work (i.e., waived, exterior-only property inspection, or interior and exterior property inspection). Preferably, collateral assessment module 26 will also compare the statistical predicted value retrieved earlier in the property assessment process against the purchase price or estimated appraisal value of the underlying real property. An appraisal will be waived if the purchase price or estimated appraisal value is accepted.

As described in greater detail hereinafter, in the event that the borrower is not approved for any loans, the loan originator is preferably provided with information from underwriting engine 24 identifying problem areas with respect to the borrower's application and suggested areas for improving the borrower's chances for approval (e.g., lower loan amount or

reduce debt), and the borrower may be referred to a help center to receive the benefit of such information and suggestions (step 70). Additionally, the HUD median income information provided during the property assessment process may be used to determine if the borrower is eligible for other types of loan products. Also, in the event that no approved products are returned, the borrower is preferably given the opportunity to review, amend and resubmit the loan application (decision 71) prior to the end of the session on system 10(step 72). If the borrower opts to amend the loan application, the process returns to step 64 and the amended loan application is re-submitted for underwriting and pricing.

With the borrower approved and the selected loan captured by system 10 (step 74, Fig. 2s), the options for aggregating lender fees (i.e., the loan originator's actual out-of-pocket fees and expenses and a prorated portion of overhead expenses and reasonable profit associated with loan origination and closing) and core closing costs (i.e., all settlement and closing costs and fees including title search/abstract costs, title examination fees, title insurance fees, etc.) with the loan principal are captured (step 75). The borrower is then asked to register with the prospect or loan originator (step 76, Fig. 2t). Registering with the prospect/loan originator provides the borrower with the ability to (i) specify a lock option (e.g., float or lock) as described in greater detail below, (ii) check on loan status (e.g., documentation received?, appraisal completed, if required?, title search completed?). It should be understood that, if the borrower is floating, he/she can request a current "live" rate quote for the selected product at any time.

Once loan approval is secured and the interest rate is locked in (step 78), the inventive loan qualification and application process is complete and a closing date is set (step

80). Fig. 2u depicts an exemplar of an Internet display screen congratulating the borrower on the successful completion of the online loan application.

Additionally, the loan originator may wish to sell the loan to a secondary mortgage market purchaser in the secondary market. Upon receiving a request to sell the individual loan, pricing engine 22 calculates a live ("spot") sales price for delivery to the loan originator in a manner described in greater detail hereinafter (step 84). It should be understood that the loan originator may initiate a request for a spot sales price for the loan in the system pipeline at any time after the loan has been rate locked in order to value the individual loan in the secondary mortgage market without selling the loan. However, the loan cannot be sold until it is closed.

Referring now to Figs. 3a through 13, in a preferred embodiment of the present invention, probable qualification calculator 20 carries out a four stage process to return a probable qualification assessment to a potential borrower. As discussed in greater detail below, the first stage of the inventive process involves soliciting the potential borrower's responses to questions presented in an online questionnaire, and, based on initial responses, determining whether the borrower meets the eligibility requirements for the type of loan(s) being considered. With eligibility requirements satisfied, the second stage of the process involves translating the potential borrower's responses to the online questionnaire into a proxy credit score. The third stage involves assigning a statistical weight to the proxy credit score and assigning weights to responses entered concerning non-credit related loan characteristics. The values of all of the weights for the individual characteristic responses are then added together and converted into a

probability. The fourth and final stage of the inventive process involves mapping the calculated probability to an empirically determined range of underwriting approval rates.

Referring to Fig. 3a, the potential borrower completes and submits to the loan originator an electronic or online questionnaire which requires the potential borrower to provide certain personal information as well as the purpose of the loan (step 100). Other information solicited in the questionnaire may include, but is not necessarily limited to, the property type (e.g., single family dwelling), the potential borrower's employment status (e.g., self-employed?), assets, annual income, monthly debt, and the number of times the potential borrower was late on credit over the previous several years. Preferably, several of the initial questions are used to determine whether the loan meets eligibility guidelines of the secondary mortgage market purchaser.

The questionnaire is the product of the present inventors' wealth of experience and know-how in identifying loan factors and borrower characteristics that are most important in obtaining an approval recommendation within existing underwriting schemes. Such factors are identified by employing statistical regression techniques applied to a historical sample of underwriting submissions with valid recommendations. Once the most influential factors are isolated and identified, the questionnaire is composed to capture this information from the potential borrower.

A representative sample of questions and formats requested for probable qualification calculator 20 in the online questionnaire according to the present invention is reproduced in Table 1 below.

Table 1

Data Item	Field	Text for Field Description in Web Page	Data Format
1	Loan Purpose	Type of home loan	1=Purchase 2=Refinance
2a	Current Mortgage Balance	What is your current mortgage balance?	Dollar amount
3b	Property Value	Purchase price	Dollar amount
3a	Property Value	What is the current value of the property?	Dollar amount
4b	Funds for Down Payment and Closing Costs	Funds for down payment and closing costs	Dollar amount
4a	Loan Amount	What is the loan amount?	Dollar amount
5	Property Type	Is the property a Condominium?	0= No Condo 1=Condo
6	Property Usage	I will use the home as...	1=Primary residence 2=Second home
7	Loan Type	Loan type	1= 30 Year Fixed rate 2 =15 Year Fixed rate 3=Adjustable Rate Mortgage 4=Balloon
8	Number of Borrowers	How many borrowers will be on the home loan application?	1 = One 2 = Two
9	Self Employed	Are any of the borrowers self-employed?	0=No 1=Yes
10	Liquid Assets	Current Cash Value of Assets	Dollar amount
11	Annual Income of all Borrowers Combined	Annual income	Dollar amount
12	Monthly Debt Payments	Total monthly debt payments not including current home loan or rent payment.	Dollar amount
13	Bankruptcies, foreclosures, tax liens or garnishments	During the past 10 years have you filed for bankruptcy, had a home foreclosed, had a tax lien filed against you, or had your income garnished by a creditor?	0=No 1=Yes
14	First Credit Account	When did you open your very first credit account?	1=Less than 1 year ago 2=From 1 up to 2 years ago 3=Greater than 2 up to 5 years ago 4=Greater than 5 up to 10 yrs ago 5=More than 10 years ago
15	Credit Accounts	How many new credit accounts have you opened in the past 2 years?	1=Fewer than 5 2=5 or more

Data Item	Field	Text for Field Description in Web Page	Data Format
16	Late on Credit	When was the last time you were more than a month late on a credit account payment?	1 = Never delinquent 2 = less than 1 year ago 3 =From 1 up to 3 years ago 4 =Greater than 3 up to 7 yrs ago 5 =More than 7 years ago
17	Number of Times late on credit	How many times during the last 7 years have you been more than one month late on a credit account payment?	0=0 1=1 2=2 3=3 4=4 5=5 or more
18	Credit Limits	What is the approximate total dollar amount of your current borrowing power? (i.e. sum of credit limits on all credit cards)	0 - 10,000 10,001 - 20,000 20,001 - 30,000 30,001 - 50,000 over 50,000
19	Credit Utilization	What is the approximate total dollar amount of money you have currently borrowed? This is the sum of all your outstanding credit card balances.	0 - 1,000 1,001 - 3,500 3,501 - 10,000 10,001 - 20,000 over 20,000
20	Interest Rate	Interest Rate	Range of 5% to 10% in 25 basis point increments

With the potential borrower's initial information and loan purpose input, the process proceeds to decision 102 which queries whether the loan purpose is a purchase or a refinance. If the loan purpose is a refinance, the potential borrower is prompted to enter refinance and home information (step 104a); if the loan purpose is a purchase, the borrower is prompted to enter purchase and home information (step 104b). As shown in Table 1, the questions differ depending on the loan purpose, i.e., purchase or refinance (data item 1). For example, referring to Table 1, if the loan is a purchase, data items 3b and 4b should be presented to the potential borrower. If the loan is a refinance, data items 2a, 3a, and 4a should be presented.

Prior to the completion of the data entry, data inputs are checked for validity for both refinance or purchase loans (steps 106a,b). For example, the amount entered in response to system 10's request for the current cash value of the potential borrower's assets (data item 10 in Table 1) must be equal to or greater than the amount entered for funds for down payment and closing costs (data item 4b). When the potential borrower enters a value for the current cash value of assets, system 10 checks it against the amount for down payment and closing costs. If the current value of assets is insufficient, a message along the lines of the following message is preferably displayed to the potential borrower:

"The current cash value of assets must be greater than or equal to the funds for down payment and closing costs. Please check these two amounts."

Thus, if all inputs are not valid, the process revisits steps 104a,b. If all inputs are valid, the process moves to steps 108a,b and sets the loan purpose as either refinance (step 108a) or purchase (step 108b), as appropriate.

With the loan purpose set as either refinance (step 108a) or purchase (step 108b), and prior to the completion of the data input, system 10 determines whether or not the loan meets preselected eligibility requirements of the secondary mortgage market purchaser (steps 110a,b, 112a,b). This is accomplished by using the first several responsive data inputs to the online questionnaire to compare product, purpose, occupancy, and calculated loan-to-value ratio ("LTV") to the secondary mortgage market purchaser's preselected underwriting guidelines which are retrievably stored in system database 16. LTV is preferably derived as follows:

LTV when loan purpose is purchase = $1 - (\text{down payment amount} / \text{purchase price})$

LTV when loan purpose is refinance = $\text{loan amount} / \text{property value}$

A loan may be designated ineligible under preselected underwriting guidelines for one of two reasons. The first reason is that the product, purpose, and occupancy selected are ineligible. The second reason is that the maximum LTV for the specific product, purpose and occupancy selected is restricted. The guidelines depicted in Table 2 below list representative maximum LTV's for each product, purpose, and occupancy type that fall within the scope of preselected requirements.

Table 2

Product	Purpose	Occupancy	LTV %
Fixed Rate	Purchase	Primary Residence	97.00
		Second Home	95.00
	Refinance	Primary Residence	90.00
		Second Home	90.00
ARM	Purchase	Primary Residence	95.00
		Second Home	95.00
	Refinance	Primary Residence	90.00
		Second Home	90.00
Balloon	Purchase	Primary Residence	95.00
		Second Home	95.00
	Refinance	Primary Residence	90.00
		Second Home	90.00

If the potential borrower enters a combination of factors that is ineligible, the borrower is notified immediately of the ineligibility and is prompted to either change the selection or call a help center for assistance (action 116). It should be understood that this allows the potential borrower to change the response to a previous question and then continue on with the probable qualification process. If the potential borrower passes the eligibility screening, the

borrower then is permitted to continue on with the probable qualification assessment and receives no eligibility feedback.

Referring now to Fig. 3b, system 10 accepts credit related information inputs concerning the potential borrower (step 120). As with previous information inputs, the credit information inputs are checked for validity (decision 122). If inputs are not valid, the process revisits step 120. If all inputs are valid, the process continues to step 128.

At step 128, the borrower information submitted is evaluated in real time and calculator 20 calculates (before an actual loan application is submitted) the probability that the potential borrower will be approved for a loan. It should be appreciated that, contrary to common practice, this prequalification process is accomplished without the need to obtain a credit report on the potential borrower. Rather, as described in greater detail below, the potential borrower's responses to the questionnaire are translated by computer software into a "proxy" credit score, statistical weights are assigned to the loan characteristics, and the result is then converted into the probability of obtaining a loan approval.

Since a credit report is not obtained, a credit score is approximated by calculator 20 based on the potential borrower's responses to the questions seeking information regarding payment history and history of credit problems, such as bankruptcy, foreclosures, tax liens, or garnishments (data item 13). Preferably, a proxy credit score is calculated differently for potential borrowers who have indicated in their response to the credit questions that they have been late on a credit payment in the recent past (for example, within the previous 7 years) and those who did not.

For borrowers without a history of credit delinquency, the proxy credit score is preferably calculated as follows:

Proxy Credit Score (w/out delinquencies) = 578 + weight for credit utilization + weight for number of accounts + weight for age of credit history + weight for public records

For borrowers with a history of credit delinquency, the proxy credit score is preferably calculated as follows:

Proxy Credit Score (with delinquencies) = 525 + weight for credit utilization and age of delinquency + weight for number of accounts + weight for age of credit history + weight for public records

Using data obtained from the borrower questionnaire, the credit utilization ratio (the desired percentage of credit utilized) is preferably calculated as the dollar amount of credit used / dollar amount of total credit limit.

$$\text{Percentage of Credit Used} = \frac{\text{Dollar Amount of Credit Balances}}{\text{Dollar Amount of Total Credit Limits}}$$

The options presented to the potential borrower by system 10 for the dollar amount of credit utilized are preferably:

\$0 - \$1,000
\$1,001 - \$3,500
\$3,501 - \$10,000
\$10,001 - \$20,000
over \$20,000

While the current options presented to the potential borrower by system 10 for the dollar amount of total credit limits are preferably:

\$0 - \$10,000
\$10,001 - \$20,000
\$20,001 - \$30,000
\$30,001 - \$50,000
over \$50,000

Example 1

If the potential borrower selects the range “\$1,001 – \$3,500” for credit utilized, and “over \$50,000” for credit limit, the % of credit used calculation would be as follows:

$$\text{Percentage of Credit Used} = \frac{(3500-1001)/2 + 1001}{50000} = 4.5\%$$

Example 2

If the potential borrower selects the range “\$3,501 – \$10,000” for credit utilized, and “\$0 – \$10,000” for credit limit, the % of credit used calculation would be as follows:

$$\text{Percentage of Credit Used} = \frac{(10000-3501)/2 + 3501}{(10000 - 0)/2 + 0} = 135\%$$

The primary difference in calculating a proxy credit score for the group consisting of those who have had a delinquency, as opposed to the group consisting of those without delinquencies, is that information concerning any delinquency is combined with a credit utilization ratio to determine a component of the proxy credit score. Also, the range of proxy credit scores is lower for this group (525 - 753) than it is for those without delinquencies (578 - 781).

The foregoing weights by attribute or characteristic preferably reside in look up tables in the system 10 database. Examples of look up tables for proxy credit scores with and without delinquencies are reproduced in Tables 3 and 4 below.

Table 3

Proxy Credit Score Attribute Weights for Applicants Without Delinquencies

Characteristic	Attribute	Proxy Credit Score Points	Maximum Score	Minimum Score
Base Score / Intercept		578	578	578
Utilization (Percentage of revolving Credit that is utilized)	80 < utilization %	0		0
	40 < utilization % <= 80	19		
	20 < utilization % <= 40	38		
	10 < utilization % <= 20	54		
	Utilization % <= 10	75	75	
How many accounts have Been established in last 2 years	Number accts. => 5	0		0
	Number accts. < 5	23	23	
Age of credit history	Years < 2	0		0
	2 <= years < 5	18		
	5 <= years < 10	34		
	10 <= years	52	52	
Public Record (Bankruptcies, foreclosures, tax liens, garnishments)	Yes	0		0
	No	53	53	
Proxy Score = sum of points			781	578

Table 4
Proxy Credit Score Attribute Weights for Applicants With Delinquencies

Characteristic	Attribute	Proxy Credit Score Points	Maximum Score	Minimum Score
Base Score / Intercept		525	525	525
Utilization (Percentage of revolving Credit that is utilized) and Recency of Delinquency	80 < utilization %			
	delq. < 1 yr	0		0
	1 yr <= delq. < 3 yrs	39		
	3 yrs <= delq. < 7 yrs	54		
	40 < utilization % <= 80			
	delq. < 1 yr	19		
	1 yr <= delq. < 3 yrs	56		
	3 yrs <= delq. < 7 yrs	68		
	20 < utilization % <= 40			
	delq. < 1 yr	42		
	1 yr <= delq. < 3 yrs	79		
	3 yrs <= delq. < 7 yrs	90		
	10 < utilization % <= 20			
	delq. < 1 yr	59		
	1 yr <= delq. < 3 yrs	97		
	3 yrs <= delq. < 7 yrs	108		
	Utilization % <= 10			
	delq. < 1 yr	78		
	1 yr <= delq. < 3 yrs	115		
	3 yrs <= delq. < 7 yrs	127	127	
How many accounts have been established in last 2 years	Number accts. => 5	0		0
	Number accts. < 5	16	16	
Age of credit history	Years < 2	0		0
	2 <= years < 5	26		
	5 <= years < 10	43		
	10 <= years	57	57	
Public Record (Bankruptcies, foreclosures, tax liens, garnishments)	Yes	0		0
	No	28	28	
Proxy Score = sum of points			753	525

Like LTV discussed above, weights may also be derived from the data entered by the potential borrower in response to the questions posed in the questionnaire. For example, monthly payment amount may be derived as follows given that the potential borrower enters the loan amount to be borrowed, the interest rate and the term of the loan.

$$\text{Monthly payment} = (\text{Loan Amount} / (1 - 1 / (1 + \text{Monthly Interest Rate})^{\text{Term In Months}})) / \text{Monthly Interest Rate}$$

$$\text{where Monthly Interest Rate} = (1 + \text{Annual Interest Rate})^{1/12} - 1$$

If the purpose of the loan is to refinance, the potential borrower provides the loan amount. If however, the purpose of the loan is a purchase, the loan amount is calculated as follows:

$$\text{Loan Amount} = \text{home purchase price} - \text{down payment}$$

It should be understood that the down payment value used is the one extracted from the borrower's input for funds available for down payment and closing costs and not the raw value provided for funds available, which includes both down payment and closing items.

Table 5 below is a chart showing model weights assigned to certain borrower characteristics.

Table 5

Characteristic	Attribute	Weight	Range of Outcomes	
			High Boundary	Low Boundary
Base Probability / Intercept		-7.4505	-7.4505	
Proxy Credit Score	741 +	0	0	
	720 <= 740	0.2252		
	700 <= 720	0.873		
	680 <= 700	1.5279		
	660 <= 680	2.0891		
	640 <= 660	2.5864		
	620 <= 640	3.0853		
	600 <= 620	3.4438		
	580 <= 600	3.7109		
	560 <= 580	3.9171		
	540 <= 560	4.0484		
	<= 540	4.0452		4.0452
Combined LTV	<= 70	0	0	
	70 <= 80	0.8801		
	80 <= 90	2.3162		
	90 <= 97	2.8347		2.8347
Back Ratio	<=20	0	0	
	20 <= 31	0.3557		
	31 <= 36	0.511		
	36 <= 45	0.6244		
	46 +	1.129		1.129
(Liquid Assets – Down payment)	10001 +	0	0	
	5000 <= 10000	0.4349		
	3000 <= 5000	0.7601		
	2000 <= 3000	1.0667		
	1000 <= 2000	1.4492		
	1 <= 1000	2.1364		
	0	3.3219		3.3219
Term of Loan	Term <= 15 yrs	0	0	
	15 < Term <= 25 yrs	0.8115		
	Term > 25 yrs	1.1472		1.1472
Self Employed	No	0	0	
	Yes	1.0178		1.0178
Two or More Borrowers	No	0		0
	Yes	-0.6865	-0.6865	
Amortization Type	Fixed Rate Mortgage	0	0	
	Balloon Mortgage	0		

	Adjustable Rate Mortgage	0.6609		0.6609
Occupancy Status	Owner Occupied	0.0167	0.0167	
	Second Home	0.1324		
	Investor Property	0		0
Number of Units	1-2	0	0	
	3-4	0.0664		0.0664
Condo	No	0	0	
	Yes	0.1058		0.1058
Derogatory Record	No	0	0	
	Yes	0.8902		0.8902
Loan Purpose	Purchase (money mortgage)	0.3416		
	Refinance: increase =< 0	1.1672		1.1672
	Refinance: increase 0.1-3%	-0.3111		
	Refinance: increase 3.1-10%	0.0661		
	Refinance: increase 10.1-19%	0.0359		
	Refinance: increase > 19%	0	0	
Weight = sum of coefficients			-8.1203	16.3863
Estimated Probability = exp(weight) / (1 + exp(weight))			0.030%	100.000%

Once the characteristics have been assigned weighting coefficients, they are summed and converted to an overall probability using the following formula:

$$\text{estimated probability of not getting approved} = \frac{\text{EXP}(\text{SUM of coefficients})}{1 + \text{EXP}(\text{SUM of coefficients})}$$

The result is the estimated probability of not getting approved for a loan. For example, if the estimated probability is 15%, this means that the borrower has an 85% chance of being approved for a loan.

Since it is desirable to communicate to the potential borrower the likelihood of getting approved, the foregoing result is desirably converted as follows and presented to the

potential borrower:

$$\text{probability of approval} = 1 - \text{probability of not getting approved}$$

It should be appreciated that, alternatively, the likelihood of getting approved may be calculated directly as follows:

$$\text{probability of approval} = 1 - [\text{EXP}(\text{SUM of coefficients}) / (1 + \text{EXP}(\text{SUM of coefficients}))]$$

Referring back to Fig. 3b, after the probability of approval is calculated (step 128), the process proceeds to decision 130 which queries whether an eligibility exception is present. For example, if the potential borrower is seeking a mortgage for greater than the value of the property, an eligibility exception will be present.

If a “yes” response is returned at decision 130, calculator 20 provides an explanation with the opportunity to start the process over (event 134). If a “no” response is returned, the process proceeds to step 138 where the final probability is checked.

The probable qualification process ends when the probable qualification determination is presented to the potential borrower in the form of a useful and readily understandable percentage chance of approval which can be easily and meaningfully compared against determinations made for other potential available loan products to permit the potential borrower to make an informed loan decision (display 140, or 142, or 144). It should be understood that the estimated probabilities for approval generated by calculator 20 closely approximate actual approval rates, thereby giving potential borrowers an accurate assessment of their likelihood of approval should they decide to proceed with the loan application.

For loans where the estimated probability of approval < 60%.

We have insufficient information to give you a response at this time. If you want to change any of the information you previously entered to see how it affects your results, feel free to click the "Try Again" button below. We also encourage you to call our help center to speak to one of our loan consultants. We will work with you to come up with the right home loan solution to meet your needs. Or you can proceed directly to the online application by clicking the "Save and Apply Now" button below.

Figs. 4 - 13 depict preferred exemplars of computer Internet interface display screens used to guide a potential borrower through the online probable qualification process.

Referring to Figs. 4 and 5, (steps 1 and 2, respectively) the potential borrower is prompted to provide responses to online questions which ask for information such as, for example: (i) the loan purpose (e.g., purchase or refinance), the number of borrowers who will be named on the loan application, (ii) the potential borrower's annual income, (iii) whether or not the potential borrower is self-employed, (iv) the potential borrower's monthly debt payments exclusive of current mortgage payment obligations or rent, (v) the current cash value of the potential borrower's assets, (vi) whether or not the subject property is a condominium, (vii) the intended use of the property (e.g., as a primary residence), (viii) the loan type (e.g., 30 year fixed rate), (ix) the anticipated purchase price, and (x) the available funds for down payment and closing. It should be understood that the funds available for down payment and closing cannot be greater than the input current cash value of the potential borrower's assets.

Figs. 6 and 7 illustrate an effect of the selection of refinance as the loan purpose.

As shown in Fig. 7, a somewhat different set of questions from the purchase scenario is presented to the potential borrower. Rather than questions regarding purchase price and funds for down payment and closing, the borrower is prompted to respond to questions concerning current mortgage balance, current property value and the desired loan amount.

Certain combinations of income, debt, loan amount/down payment, property value and loan type produce loan profiles that are not handled by calculator 20. Such loans are deemed to be ineligible. The determination of eligibility can be made after receiving inputs from steps 1 and 2 (regardless of whether purchase or refinance is selected). If calculator 20 determines that the input characteristics indicate ineligibility, a message such as depicted in Fig. 8 is displayed.

As stated above, it should be understood that the funds available for down payment and closing cannot be greater than the input current cash value of the potential borrower's assets. If the current cash value of assets is less than the amount indicated as funds available for down payment and closing costs, a message preferably such as depicted in Fig. 9 is displayed.

Step 3, the final step, is concerned with the potential borrower's credit. As depicted in Fig. 10, the potential borrower is prompted to provide responses to online questions which ask for information such as, for example: (i) whether or not in the previous ten (10) years the borrower filed for bankruptcy, or had a loan foreclosed, or had a tax lien filed against him/her, or had income garnished by a creditor, (ii) when the potential borrower opened his/her first credit account, (iii) the number of new credit accounts opened in the previous two (2) years,

(iv) the last time the potential borrower was more than a month late on a credit account payment, (v) the total credit potentially available to the potential borrower, and (vi) the potential borrower's total outstanding credit balance. The last two questions combine to produce the percentage of credit used (i.e., money borrowed divided by borrowing limit) which, utilizing the tables set forth above, is used to arrive at the proxy credit score.

Step 3 does not depend on whether purchase or refinance was selected by the potential borrower as the loan purpose in step 1 - but the borrower will not reach step 3 unless the loan was deemed to be eligible after completion of step 2. At the completion of step 3, the calculated probable qualification assessment is communicated to the potential borrower (e.g., after the borrower clicks on the "See Results" button on the previous screen depicted in Fig. 10).

If the calculated probability of approval is equal to or greater than 80%, the exact approval figure is presented to the potential borrower. In Fig. 11 for example, an 86% approval figure is displayed.

With probabilities of approval less than 80% but equal to or greater than 60%, percentage figures of approval are preferably not shown. The results message depicted in Fig. 12 however, is preferably displayed to users in this middle bracket.

With a probability of approval of less than 60%, a message such as shown in Fig. 13 is preferably displayed to the potential borrower.

If the borrower chooses to apply for a loan, the loan originator makes a request for an underwriting decision. In response to such request, system 10, through underwriting engine 24, will provide to the loan originator an underwriting recommendation, lender and borrower

findings, and a borrower/product specific interest rate as described in greater detail hereinafter. It should be recognized that if the borrower used probable qualification calculator 20, all applicable information will preferably populate the loan application to minimize data entry.

Prior to commencement of the underwriting process, it is desirable that a credit report be obtained on the potential borrower. The principal reasons for obtaining a credit report at this point are twofold: (1) to speed loan evaluation so that when the loan application is ready to be underwritten, the process need not be delayed while the credit report is obtained from outside credit agencies, and (2) to extract the potential borrower's real estate tradelines (e.g., outstanding mortgages, home equity loans) appearing on the credit report and present them to the borrower for clarification if necessary (e.g., that the tradeline has already been paid off, or that it will be paid off with the present contemplated loan, or that it is in error). Also, it should be appreciated that this reduces the level of data entry expected from the potential borrower as the borrower need not enter information concerning any tradelines. Moreover, this streamlines processing by the lender by eliminating the need for the lender to reconcile tradelines prior to underwriting.

A property assessment is also preferably obtained prior to underwriting for three principal reasons: (1) to speed loan evaluation, (2) to permit the potential borrower the opportunity to correct the address of the underlying property if necessary, and (3) to determine government HUD median income information for use by underwriting engine 24 in connection with the problem solution finding process or borrower guidance process described in greater detail hereinafter. Generally, the solution finding process is a process within underwriting that provides the loan originator with suggestions regarding potential areas for improvement in the

event a borrower is not approved by underwriting engine 24 (e.g., the suggestion that the potential borrower apply more money toward the down payment to lower LTV). The solution finding process can use the HUD median income information to determine if the borrower meets low/moderate income requirements. This information is provided to the loan originator and can be used if the loan originator wishes to offer other types of products to the borrower.

Underwriting engine 24 provides to the loan originator one of two recommendations: (1) “approved,” or (2) “refer to help center” or like message. It should be understood that the underwriting recommendation provided by the secondary mortgage market participant (most preferably, Fannie Mae) through underwriting engine 24 for each loan submitted through system 10 does not constitute an approval or denial of the loan application by such secondary market participant. With respect to loan applications which receive a “refer to help center” recommendation, the loan originator will preferably work with the potential borrower, as appropriate, to (i) reconcile inaccurate information in the loan application, (ii) counsel the potential borrower regarding ways to improve the likelihood of obtaining an approval, and (iii) resubmit the application for re-underwriting through system 10.

For loan applications receiving an “approved” recommendation, underwriting engine 24 preferably communicates the conditions to be satisfied by the loan originator and the potential borrower before the application can proceed to closing. These conditions preferably include (i) the required level of collateral appraisal field work, if any, (ii) title insurance requirements, (iii) required information relating to verification of the potential borrower’s

income, assets, employment, and identity, and (iv) review and collection of required supporting documentation.

It should be understood that the foregoing verification process may require human participation. For example, in the case of a mortgage loan, a credit report is pulled and may require review, and, notwithstanding the waiver of the requirement for an appraisal by collateral assessment module 26 (as discussed in greater detail hereinafter), the loan originator might arrange at least for a cursory exterior-only inspection of the underlying real estate.

For loan applications receiving a “refer to help center” recommendation, underwriting engine 24 preferably provides problem solving or guidance information to facilitate borrower counseling by the loan originator regarding steps the potential borrower can take to improve the likelihood of approval within system 10. This is the problem solution process referred to above. Such guidance information preferably includes the amount the down payment needs to be increased, and the amount of debt that the potential borrower needs to pay off.

The process between underwriting and pricing is iterative. For each product on which system 10 is making an underwriting decision, pricing engine 22 is invoked to provide a borrower/product specific interest rate, and underwriting engine 24 underwrites the selected product as described in greater detail hereinafter. The interaction between underwriting and pricing is best illustrated in Fig. 14a.

Underwriting engine 24 underwrites the borrower for selected loan products as well as for other available products, and determines if the borrower is approved for each product. The response to the loan originator is all of the approved products and their associated interest

rate quotes. This allows the borrower to review all the information, compare products and interest rates and select the product that best fits the borrower's needs.

Underwriting engine 24 also determines, for each approved product, the minimum amount of verification documentation (e.g., minimum assets to verify, minimum income to verify), selected loan underwriting parameters, assuming no other data changes, (e.g., maximum loan amount for approval, maximum loan amount for aggregating closing costs with the loan principal, and minimum refinance amount), as well as the maximums and minimums used to tailor the interest rate quote (maximum schedule interest rate and maximum number of points) and maximum interest rate approved for float up to a preselected increase over a current approved rate. It should be appreciated that this allows the potential borrower to provide only that information that is necessary for an approval decision, rather than all potentially relevant financial and other borrower information. This also reduces the processing burden on system 10.

Referring now to Fig. 14a, when the loan originator makes an underwrite and price request, the request is received by underwriting engine 24 (step 200). If the loan originator provides the borrower selected product and indicative interest rate (decision 202), the process continues to step 204. If the loan originator is not providing an indicative interest rate with a selected product, underwriting engine 24 preferably requests a sample indicative interest rate (e.g., for a "typical" borrower) to seed or start the underwriting process for a specific product, and pricing engine 22 returns the seed interest rate (step 206). It should be understood that the seed interest rate may be the same as the enticement interest rate described herein.

Underwriting engine 24 then determines the data required to generate a borrower/product specific interest rate (step 204). Thereafter, underwriting engine 24 requests the borrower/product specific interest rate, and pricing engine 22 then calculates the borrower/product specific interest rate and the yield/point trade-off schedule to be returned to the loan originator in a manner described in greater detail hereinafter in connection with Fig. 15 (step 208).

At decision 210, underwriting engine 24 determines if the potential borrower is approved for the product at the borrower/product specific interest rate.

If approved, underwriting engine 24 tailors the yield/point trade-off schedule for the loan product by (i) limiting the upper interest rate boundary by the maximum schedule interest rate and the maximum schedule premium points, and (ii) limiting the lower interest rate boundary by the minimum schedule interest rate and the maximum schedule discount points (in a manner described below in connection with Fig. 14b). Underwriting engine 24 then provides the underwriting findings and interest rate quotes to the loan originator (step 214).

The maximum schedule interest rate is the maximum interest rate approved by underwriting engine 24; and the maximum schedule premium points are the maximum number of premium points approved by the underwriting engine. The minimum schedule interest rate is the minimum interest rate approved by underwriting engine 24; and the maximum schedule discount points are the maximum number of discount points approved by the underwriting engine.

Referring to Fig. 14b, underwriting engine 24 preferably determines the minimum amount of verification documentation required for each approved borrower-specific loan product

More particularly, underwriting engine 24 determines the minimum income and assets to verify, as appropriate (step 216).

The selected loan underwriting parameters are then determined (step 217). That is, approval for the maximum loan amount (and LTV), the maximum loan amount for aggregating closing costs with the loan principal, and the minimum refinance amount are determined, as appropriate, provided no other data changes.

The pricing parameters used to tailor the interest rate quote are then determined (step 218). That is, the maximum schedule interest rate and maximum number of premium points, and minimum schedule interest rate and maximum number of discount points, and maximum market interest rate approved for float (up to a preselected increase over a current approved rate) are determined, as appropriate.

The foregoing are then used to tailor the borrower/product specific interest rate quote (step 220). After step 220, the process proceeds to step 222 where the underwriting findings are formatted for presentation to the loan originator (see Fig. 14a, step 214).

Referring back to Fig. 14a, once the underwriting findings for a specific selected product are presented to the loan originator, underwriting engine 24 repeats the foregoing process to determine all approved products for the borrower until all such products have been underwritten (step 232). It should be appreciated that this places at the borrower's fingertips a valid, borrower-specific interest rate quote for all loan products for which the borrower has been approved (e.g., whether a 30 year fixed rate mortgage loan, a 15 year fixed rate loan, or other

loan product) so that the borrower has a complete range of approved products with associated interest rates to select from.

If the potential borrower is not approved for any product at step 210, underwriting engine 24 preferably executes a process to provide the loan originator with information designed to provide guidance with respect to problem areas that need to be addressed to improve the potential borrower's chances of approval for the product selected by the potential borrower. As best illustrated in Fig. 14c, underwriting engine 24 computes the maximum loan amount for approval (step 224), the monthly debt reduction required for approval (step 226), and determines if the potential borrower meets low/moderate income requirements for other types of loan products (step 227).

Referring to Fig. 14a, after execution of the problem solution routine, underwriting engine 24 discards the pricing schedule for the specific selected loan product (step 228). If underwriting engine 24 determines that there are additional loan products available for underwriting (step 229), the process repeats (i.e., returns to step 200). If there are no additional loan products to be underwritten, the process ends (event 230).

Pricing engine 22 of system 10 calculates the retail gross interest rate and points for each approved borrower/loan specific product combination passed through underwriting engine 24 to present to the borrower, as described in greater detail below. Pricing engine 22 also calculates a sales price (spot price) for each loan, i.e., the secondary market price that a secondary mortgage market purchaser will pay the loan originator for the individual loan.

The gross interest rate calculated by pricing engine 22 preferably includes a portfolio required yield and a customer risk-based price component. The portfolio required yield is a real time required yield based on current market conditions, and is preferably stored in a look up table residing in system 10. The portfolio required yield is also used to determine a spot price.

The yield/point trade-off schedule shows the relationship between points paid or rebated and the associated change in interest rate (preferably in 1/8 increments) for a given mortgage product. Yield is expressed as an offset from the par portfolio required yield, and points are expressed as offsets from par (100%). An example of a yield/point trade-off schedule is set forth in Table 7 below.

The customer risk-based price component includes a risk-based guaranty fee and a collateral risk price adjustment, among other appropriate fees and adjustments such as servicing fees and other borrower-specific credit risk price adjustments. The risk-based guaranty fee compensates the secondary mortgage market purchaser for its exposure to the credit risk posed by the particular borrower. The risk-based guaranty fee varies by loan product and is expressed in yield.

The collateral risk price adjustment is a per loan adjustment to the interest rate to compensate the secondary mortgage market purchaser for any risk arising from not requiring a property appraisal. Relying, in part, on historical data retrieved from a system database concerning the collateral (e.g., prior assessments of real estate, assessments of comparable real estate), collateral assessment module 26 determines the minimum type of appraisal, if any, that is required with respect to each individual loan application submitted for an underwriting

recommendation through underwriting engine 24 of system 10. Collateral assessment module 26 may not require any appraisal or property field work. Alternatively, collateral assessment module 26 may require an appraisal with an interior and exterior inspection, or it may require that an appraisal with an exterior-only property inspection be performed and reported to underwriting engine 24. In the event that collateral assessment module 26 waives the appraisal or field work requirement, a loan level interest rate adjustment is made (i.e., the collateral risk price adjustment).

For loans with an LTV in excess of 80%, pricing engine 22 provides a low down payment rate adjustment to be added to the interest rate. The low down payment rate adjustment compensates the investor for potential borrower default associated with a lower down payment.

Referring now to Fig. 15, the following underwriting characteristics are preferably input into pricing engine 22 in order to begin the pricing process: (i) casefile ID, (ii) requested product, (iii) prospect or loan originator ID, (iv) combined loan-to-value (CLTV), (v) LTV, (vi) property type, (vii) loan purpose, (viii) cashout percentage, (ix) self-employment indicator (e.g., Y/N), (x) months of cash reserves, (xi) total expense ratio, (xii) appraisal field work type, and (xiii) appraisal waiver reason (step 300). Pricing engine 22 retrieves the foregoing underwriting characteristics (step 302). The process then proceeds to step 304 where pricing engine 22 calculates the customer risk-based price component.

Fig. 16 illustrates the calculation of the customer risk-based price component. At step 400, pricing engine 22 retrieves the risk-based guaranty fee. Fig. 17 illustrates the process associated with looking up the risk based guaranty fee.

With access to the underwriting characteristics input at the beginning of the pricing process as illustrated in Fig. 17, the lookup process moves to decision 500 which queries if the loan purpose is refinance. If a “no” response is returned, the process moves to decision 502 which queries if the loan purpose is purchase. If a “yes” response is given at decision 500, i.e., if the loan purpose is refinance, the process moves to decision 504 which queries if the equity taken out exceeds closing costs. If a “no” response is given at decision 502, i.e., if the loan purpose is indicated as being neither a purchase nor a refinance, an error message indicating an invalid loan purpose is generated and the process terminates (event 503).

If, at decision 504 the equity taken out (“cashout percentage”) exceeds closing costs (which represents an increased risk associated with the loan), the process proceeds to step 506 where the loan purpose is set as refinance, and then to step 508 as described below. If the equity taken out does not exceed closing costs, the process proceeds to step 510 where the loan purpose is set as purchase, and then to step 508. The inventors have determined that, statistically, the risk associated with a loan refinance where the amount of equity taken out is not substantially greater than an amount sufficient to cover closing costs is equivalent to the risk associated with a loan the purpose of which is not refinance but rather purchase (hence, step 510).

If a “yes” response is returned at decision 502, i.e., if the loan purpose is purchase, the process moves to step 508.

At step 508, pricing engine 22, using the risk-based guaranty fee schedule stored in system 10 associated with the loan registration date and time, looks up the risk-based guaranty

fee by the input underwriting characteristics, and makes the fee available for further use in the pricing process.

Referring back to Fig. 16, with the retrieval of the risk-based guaranty fee (step 400), pricing engine 22 retrieves the low down payment rate adjustment from a look up table (step 402) and adds it as yield to loans with an LTV over 80% to compensate the investor for potential borrower default associated with a lower down payment.

At step 404, pricing engine 22 sets the risk-based guaranty fee equal to the risk-based guaranty fee retrieved from the look up table less the low down payment rate adjustment (step 404). Then, based on prospect/loan originator ID and product, pricing engine 22 executes a look-up to retrieve the servicing fee (step 406).

Pricing engine 22 retrieves a product specific conversion ratio at step 410. Pricing engine 22 then retrieves a technology price adjustment (step 414) and converts it to a basis point value (step 416). It should be appreciated that converting dollar value to basis point value is accomplished by a mathematical calculation that is well known to those of ordinary skill in the art.

The process for computing the customer risk-based price component continues to decision 418 which queries whether the requirement for a field property appraisal has been waived. If a “no” response is returned at decision 418, the collateral risk price adjustment is set equal to zero basis points (step 420), and the process proceeds to decision 422, i.e., there is no reason to increase the interest rate of the loan to cover the risk associated with not requiring an appraisal. If a “yes” response is returned at decision 418, the interest rate of the loan needs to be

increased to reflect the risk associated with not requiring an appraisal. Pricing engine 22 interrogates the appraisal waiver reason identification to determine the appropriate increase to the interest rate - that is, the process proceeds to decision 424 which queries if the reason for waiving the appraisal is that the market value of the underlying property (as evidenced by the sale price of the property) agrees with the property assessment and has been accepted by system 10.

If a “no” response is returned at decision 424, the collateral risk price adjustment is set equal to a preselected number of basis points (step 426), and the process proceeds to decision 422. If a “yes” response is returned at decision 424, the collateral risk price adjustment is set equal to another preselected number of basis points (step 428), and the process proceeds to decision 422. It should be understood that the foregoing basis points are preselected based on the risk associated with the loan.

At decision 422, pricing engine 22 queries if the loan purpose is a refinance. If a “no” response is returned, the title risk price adjustment is set equal to zero basis points (step 430), and the process proceeds to step 432. If a “yes” response is returned at decision 422, the title risk price adjustment is set equal to a preselected number of basis points (step 434), and the process proceeds to step 432.

At step 432, the customer risk-based price component is calculated as the sum of the risk based guaranty fee, the technology price adjustment, the collateral risk price adjustment, and the title risk price adjustment, among others. The resulting sum is then returned to the pricing process as yield (step 436), and the pricing process continues at step 332 in Fig. 15.

Referring back to Fig. 15, after the customer risk-based price component is calculated (step 304), the pricing process proceeds to step 306 where the portfolio required yield and yield/point trade-off schedule currently in effect or as of a specified date/time are retrieved from a look up table stored in system 10.

Table 7 below depicts an exemplar yield/point trade-off schedule in connection with underwriting and pricing a hypothetical loan (i.e., a 30 year fixed rate mortgage with a loan principal of \$87,000, a LTV of 87% and a par portfolio yield of 7.758%). In reading the schedule set forth in Table 7 starting, for example, with the first discount increment 0.125 below par (0.00), for the first 12.5 basis points in yield, the number of discount points the borrower would pay would be .481 points. With a discount increment of 25 basis points in yield, the number of discount points the borrower would pay would be .969 points. It should be recognized that the transaction data set forth in Table 7 is not fully representative of all data utilized by system 10.

<u>TRANSACTION: Underwrite & Price (Input)</u>	
Application Data	This scenario is based on the following assumptions:
	30 Year Fixed Rate Mortgage (FRM) \$87,000 UPB
	87 LTV 45 day closing

<u>TRANSACTION: Underwrite & Price (Output)</u>																								
1. CasefileID	1000000000000001																							
2. Product	30 Year FRM																							
3. Par Portfolio Yield	7.758%																							
4. Customer Price Component	0.500%																							
5. Low Down Payment Rate Adjustment	0.375%																							
6. Yield/Point Trade-Off Schedule																								
<table border="1"> <thead> <tr> <th>Yield</th><th>Points</th></tr> </thead> <tbody> <tr><td>(0.500)</td><td>(1.786)</td></tr> <tr><td>(0.375)</td><td>(1.355)</td></tr> <tr><td>(0.250)</td><td>(0.914)</td></tr> <tr><td>(0.125)</td><td>(0.462)</td></tr> <tr><td>0.000</td><td>0.000</td></tr> <tr><td>0.125</td><td>0.481</td></tr> <tr><td>0.250</td><td>0.969</td></tr> <tr><td>0.375</td><td>1.465</td></tr> <tr><td>0.500</td><td>1.968</td></tr> <tr><td>0.625</td><td>2.475</td></tr> </tbody> </table>			Yield	Points	(0.500)	(1.786)	(0.375)	(1.355)	(0.250)	(0.914)	(0.125)	(0.462)	0.000	0.000	0.125	0.481	0.250	0.969	0.375	1.465	0.500	1.968	0.625	2.475
Yield	Points																							
(0.500)	(1.786)																							
(0.375)	(1.355)																							
(0.250)	(0.914)																							
(0.125)	(0.462)																							
0.000	0.000																							
0.125	0.481																							
0.250	0.969																							
0.375	1.465																							
0.500	1.968																							
0.625	2.475																							
7. Maximum Schedule Interest Rate	9.125%																							
8. Maximum Number of Points	2.475																							
9. Maximum LTV for Rate	90%																							
10. Maximum Market Interest Rate for Float	10.625%																							
11. Pricing as of Date/Time	05/22/2000 10:00 a.m.																							

At the end of the pricing process, pricing engine 22 returns the par portfolio yield for the loan product, the customer risk-based price component, and the yield/point trade-off schedule for presentation to the potential borrower (step 308).

Desirably pricing engine 22 also generates sample interest rates that prospects or other loan originators can display to the general public (e.g., over the Internet) to entice potential borrowers to consider the loan products available through the prospect or other loan originator. Preferably, such enticement rates are customized for each prospect/loan originator and will reflect either interest rates that a "typical" borrower may expect to receive, or rates that a fictitious highly qualified borrower may expect to receive to illustrate the best interest rates that the prospect/loan originator can provide.

As interest rates change with market fluctuations, pricing engine 22 preferably generates a new set of enticement rates for each prospect/loan originator. An important aspect of the system according to the present invention is its ability to customize a "typical" borrower for each prospect/loan originator. Additionally, each prospect/loan originator can create a plurality of "typical" borrowers in order to show ranges or interest rates which may best match the characteristics of target potential borrowers.

Following the underwriting and pricing process described above, the borrower has the ability to rate lock. That is, the borrower can select a product, interest rate/point combination and a rate lock option (i.e. float or lock) online. A locked rate is fixed at the time the borrower elects or is required by the loan originator to lock.

A benefit of system 10 is that if a borrower decides to float, they can request and receive an online, up-to-the-minute interest rate quote that is unique to them. This is not a sample interest rate. Rather, it is an actual borrower/product specific "live" interest rate quote that is available to the borrower to lock in.

Also, the loan originator may initiate a request for a spot sales price for a particular loan in the system pipeline at any time after the loan has been rate locked. It should be appreciated that this enables the loan originator to value the individual loan in the secondary market without selling the loan.

Referring to Fig. 18a, to request a spot price, the loan originator provides information to pricing engine 22 including the gross interest rate (step 600). Once the information is provided at step 600, the process proceeds to step 602 where information concerning the selected loan product, the rate lock status, the customer risk-based price component, and the sale status is retrieved by casefile ID.

The process then continues to decision 604 where pricing engine 22 verifies that the input product is the selected product. If not, an error message is generated indicating that the product does not match the selected product and the process terminates (event 606). If the input product is indeed the selected product, the process proceeds to decision 608 which queries if the loan has been sold.

If a "yes" response is returned at decision 608, an error message is generated indicating that the loan has already been sold to a secondary mortgage market purchaser, most

preferably, Fannie Mae (event 610). If a “no” response is given, the process moves to decision 612 which queries if the rate status is lock.

If the rate status is lock, the process moves to step 614 and a spot price is generated as described in greater detail below in connection with Fig. 18b. If a “no” response is returned at decision 612, i.e., if the rate status is not lock (float), an error message is generated indicating that the loan must be locked in order to obtain a spot price (event 618).

At step 614, pricing engine 22 generates the spot price utilizing input data including the product, customer risk-based price component, and gross interest rate. Referring now to Fig. 18b, pricing engine 22 retrieves the current product specific par portfolio yield from a look up table (step 700). Pricing engine 22 then retrieves the current product specific yield/point trade-off schedule (step 702).

At step 704, pricing engine 22 calculates the interest rate portfolio yield as the gross interest rate less the customer risk-based price component less other appropriate adjustments. At step 706, pricing engine 22 calculates the yield difference as the current par portfolio yield less the interest rate portfolio yield. At step 708, pricing engine 22 calculates the price difference as the yield difference multiplied by an appropriate trade-off ratio (i.e., what is paid in price for one basis point in yield). Then, the spot price is calculated as 100 minus the price difference (step 710).

Referring back to Fig. 18a, with the spot price calculated, pricing engine 22 sets the pricing date equal to the current date (step 630) and packages the spot price and the current date as output (step 632).

To sell a loan to a secondary mortgage market purchaser in the secondary market, the loan originator initiates a sell loan transaction via pricing engine 22. Upon receiving the request, pricing engine 22 confirms that the loan originator has provided all required underwriting characteristics (e.g., casefile ID, product, and gross interest rate), and calculates the sales price for delivery to the loan originator. This necessitates that pricing engine 22 carry out the additional step of setting the acquisition price equal to the spot price (as calculated above) at the current date (i.e., the date of the acquisition).

In accordance with the foregoing, the present invention provides an online system and process for enabling a potential borrower to obtain (from a prospect in the mortgage business or other loan originator) a meaningful, real time, anonymous assessment of the likelihood of being approved for a loan based on limited information provided by the potential borrower without the need for a credit report or a property appraisal. The present invention further provides an online, real time, firm underwriting decision on each loan product offered by the lender for which the borrower is eligible regardless of whether or not the borrower has identified actual collateral to collateralize the loan, and the opportunity to aggregate fees and closing costs with the loan principal.

Also, the inventive system and process calculate an interest rate and points that are customized to the borrower in connection with the loan products offered by the lender for which the borrower is eligible.

CLAIMS

What is claimed is:

1. A method of qualifying and applying for a loan online, comprising the steps of:

obtaining financial information concerning a potential borrower;

determining the likelihood that said potential borrower will be approved for a loan;

evaluating a loan application for said loan, said loan application including said financial information and specifying a loan principal;

underwriting said loan to determine an approval status of said borrower for said loan and for other loans based on preselected underwriting guidelines; and

calculating a customized interest rate based on said financial information for presentation to said borrower for said loan and for each of said other loans for which said borrower is approved.

2. The method of claim 1, further comprising the steps of:

selecting one of said loan and other loans;

locking in said customized interest rate for said selected loan; and

aggregating closing costs into said loan principal of said selected loan.

3. The method of claim 2, further comprising the step of calculating a current price at which a secondary mortgage market purchaser will purchase said selected loan.

4. The method of claim 1, wherein said step of determining the likelihood that said potential borrower will be approved for said loan is performed without reliance on a credit report.

5. The method of claim 1, wherein said step of determining the likelihood that said potential borrower will be approved for said loan is performed without reliance on a collateral appraisal.

6. The method of claim 1, wherein said step of evaluating said loan application involves the step of obtaining a credit report on said potential borrower.

7. The method of claim 1, wherein said step of underwriting said loan involves the step of determining an appropriate level of collateral appraisal field work to be performed.

8. The method of claim 7, wherein said appropriate level of collateral appraisal field work is one of waived, exterior-only collateral inspection and interior and exterior collateral inspection.

9. The method of claim 1, wherein said loan is a home mortgage loan.

10. The method of claim 9, wherein said home mortgage loan is a mortgage refinance.

11. A method of determining the likelihood that a potential borrower will be approved for a loan, comprising the steps of:

obtaining financial information concerning a potential borrower and a loan;

determining if said potential borrower and said loan meet preselected underwriting guidelines of a secondary mortgage market purchaser based on said financial information;

if it is determined that at least one of said borrower and said loan does not meet said preselected guidelines, revising said financial information concerning said potential borrower and said loan and determining if said guidelines are met based on said revised financial information;

calculating a proxy credit score based on said financial information if it is determined that said borrower and said loan meet said preselected guidelines;

obtaining statistical weights from a look up table;

assigning said statistical weights to preselected characteristics of said loan;

calculating a probability that said potential borrower will be approved for said loan based on said proxy credit score and said statistical weights; and

presenting to said potential borrower a percentage probability of approval for said loan.

12. The method of claim 11, wherein said step of obtaining financial information concerning a potential borrower and a loan involves soliciting responses from said potential borrower to a questionnaire provided over a global computer network.

13. The method of claim 12, wherein said global computer network is the Internet.

14. The method of claim 11, wherein said proxy credit score is lowered if said potential borrower has a history of credit delinquencies.

15. The method of claim 11, wherein said loan is a home mortgage loan.

16. The method of claim 15, wherein said home mortgage loan is a mortgage refinance.

17. A method of underwriting an online loan application, comprising the steps of:
retrieving an interest rate that is calculated to be specific to a potential borrower and a loan;

retrieving a yield/point trade-off schedule for said loan;

determining if said potential borrower is approved for said loan at said specific interest rate;

if it is determined that said potential borrower is approved for said loan at said specific interest rate, (i) determining minimum verification documentation, (ii) determining selected loan underwriting parameters, (iii) determining pricing parameters, and (iv) tailoring said yield/point trade-off schedule for said loan based on said pricing parameters;

if it is determined that said potential borrower is not approved for said loan at said specific interest rate, (i) determining a maximum loan amount for approval, (ii) determining a

23. A method of determining an interest rate quote and points for a loan that are specific to a borrower, comprising the steps of:

inputting borrower and loan information;

retrieving underwriting characteristics;

retrieving a required yield from a current yield/point trade-off schedule; and

calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose.

24. The method of claim 23, wherein said loan is a home mortgage loan.

25. The method of claim 24, wherein said home mortgage loan is a mortgage refinance.

26. A method of determining an interest rate quote and points for a loan that are specific to a hypothetical borrower for presentation by a loan originator to at least one potential borrower to solicit business, comprising the steps of:

inputting financial information representative of a hypothetical potential borrower based on preselected specifications of said loan originator;

inputting loan information;

retrieving underwriting characteristics;

retrieving a required yield from a current yield/point trade-off schedule; and

calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said hypothetical borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose.

27. A method of determining a current value for an individual mortgage loan in the secondary mortgage market, comprising the steps of:

retrieving information concerning a specific loan including a gross interest rate;

verifying that said loan has been rate locked;

retrieving a required yield from a current yield/point trade-off schedule;

calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose;

calculating an interest rate portfolio yield as said gross interest rate less said adjustments;

calculating a yield difference as said required yield less said interest rate portfolio yield;

retrieving a trade-off ratio that reflects what is paid in price for one basis point in yield;

calculating a price difference as said yield difference multiplied by said trade-off ratio; and

subtracting said price difference from 100.

28. A system for qualifying and applying for a loan online, comprising:
input means for obtaining financial information concerning a potential borrower;
means for determining the likelihood that said potential borrower will be
approved for a loan;
means for evaluating a loan application for said loan, said loan application
including said financial information and specifying a loan principal;
means for underwriting said loan to determine an approval status of said borrower
for said loan and for other loans based on preselected underwriting guidelines; and
means for calculating a customized interest rate quote based on said financial
information for presentation to said borrower for said loan and for each of said other loans for
which said borrower is approved.

29. The system of claim 28, further comprising:

means for selecting one of said loan and other loans;
means for locking in said customized interest rate for said selected loan; and
means for aggregating closing costs into said loan principal of said selected loan.

30. The system of claim 29, further comprising means for calculating a current
price at which a secondary mortgage market purchaser will purchase said selected loan.

31. The system of claim 28, further comprising means for obtaining a credit report
on said potential borrower.

32. The system of claim 28, further comprising means for determining an appropriate level of collateral appraisal field work to be performed.

33. The system of claim 32, wherein said appropriate level of collateral field work is one of waived, exterior-only collateral inspection and interior and exterior collateral inspection.

34. The system of claim 28, wherein said loan is a home mortgage loan.

35. The system of claim 34, wherein said home mortgage loan is a mortgage refinance.

36. A system to determine the likelihood that a potential borrower will be approved for a loan, comprising:

input means for obtaining financial information concerning a potential borrower and a loan;

means for determining if said potential borrower and said loan meet preselected underwriting guidelines of a secondary mortgage market purchaser based on said financial information;

means for prompting said potential borrower to revise said financial information if it is determined that at least one of said borrower and said loan does not meet said preselected guidelines;

means for calculating a proxy credit score based on said financial information if it is determined that said borrower and said loan meet said preselected guidelines;

means for obtaining statistical weights from a look up table;

means for assigning said statistical weights to preselected characteristics of said loan;

means for calculating a probability that said potential borrower will be approved for said loan based on said proxy credit score and said statistical weights; and

means for communicating to said potential borrower a percentage probability of approval for said loan.

37. The system of claim 36, wherein said input means for obtaining financial information concerning a potential borrower and a loan includes a questionnaire provided over a global computer network.

38. The system of claim 37, wherein said global computer network is the Internet.

39. The system of claim 36, wherein said proxy credit score is lowered based on past credit delinquencies of said potential borrower.

40. The system of claim 36, wherein said loan is a home mortgage loan.

41. The system of claim 40, wherein said home mortgage loan is a mortgage refinance.

42. A system for underwriting an online loan application, comprising:

means for retrieving an interest rate that is specific to a potential borrower and a loan;

means for retrieving a yield/point trade-off schedule for said loan;

means for determining if said potential borrower is approved for said loan at said specific interest rate;

means for (i) determining minimum verification documentation, (ii) determining selected loan underwriting parameters, (iii) determining pricing parameters, and (iv) tailoring said yield/point trade-off schedule for said loan based on said pricing parameters, if it is determined that said potential borrower is approved for said loan at said specific interest rate;

means for (i) determining a maximum loan amount for approval, (ii) determining a monthly debt reduction required for approval, and (iii) determining if said potential borrower meets preselected income requirements for alternative loan products, if it is determined that said potential borrower is not approved for said loan at said specific interest rate; and

means for outputting underwriting findings and, if the potential borrower is approved, outputting interest rate quotes.

43. The system of claim 42, wherein said minimum verification documentation is directed to at least one of minimum assets to verify and minimum income to verify.

44. The system of claim 42, wherein said selected loan underwriting parameters include a maximum loan amount, a maximum loan amount for aggregating closing costs into principal of said loan, and a minimum refinance amount.

45. The system of claim 42, wherein said pricing parameters include a maximum schedule interest rate, a maximum schedule premium points, a minimum schedule interest rate, a maximum schedule discount points, and a maximum market interest rate for float.

46. The system of claim 42, wherein said loan is a home mortgage loan.

47. The system of claim 46, wherein said home mortgage loan is a mortgage refinance.

48. A system for determining an interest rate quote and points for a loan that are specific to a borrower, comprising:

input means for obtaining borrower and loan information;

means for retrieving underwriting characteristics;

means for retrieving a required yield from a current yield/point trade-off schedule;

and

means for calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose.

49. The system of claim 48, wherein said loan is a home mortgage loan.

50. The system of claim 49, wherein said home mortgage loan is a mortgage refinance.

51. A system for determining an interest rate quote and points for a loan that are specific to a hypothetical borrower for presentation by a loan originator to at least one potential borrower to solicit business, comprising:

input means for obtaining financial information representative of a hypothetical potential borrower based on preselected specifications of said loan originator;

input means for obtaining loan information;

means for retrieving underwriting characteristics;

means for retrieving a required yield from a current yield/point trade-off schedule;

and

means for calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said hypothetical borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose.

52. A system for determining a current value for an individual loan in the secondary mortgage market, comprising:

means for retrieving information concerning a loan including a gross interest rate;

means for verifying that said loan has been rate locked;

means for retrieving a required yield from a current yield/point trade-off schedule for said loan;

means for calculating adjustments to said required yield associated with said loan based on at least one of (i) credit risk posed by said borrower, (ii) collateral risk associated with not requiring a collateral appraisal, (iii) loan-to-value ratio, and (iv) loan purpose;

means for calculating an interest rate portfolio yield as said gross interest rate less said adjustments;

means for calculating a yield difference as said required yield less said interest rate portfolio yield;

means for retrieving a trade-off ratio that reflects what is paid in price for one basis point in yield;

means for calculating a price difference as said yield difference multiplied by said trade-off ratio; and

means for subtracting said price difference from 100.

ABSTRACT OF THE DISCLOSURE

A system and process for a potential borrower to ascertain the likelihood that the borrower will qualify for a mortgage loan online in real time, and to apply for and obtain a loan that is priced to reflect the individual borrower's specific financial and other relevant characteristics. System software evaluates borrower information submitted to the loan originator electronically in real time to make the determination, before the actual loan application is submitted and without the need to obtain a credit report or a collateral appraisal, how likely it is that the potential borrower's loan application will be approved. If the borrower chooses to apply for a loan, the system underwrites the loan and calculates interest rates and points based on the specific financial profile and other relevant characteristics of the particular borrower, and also on the credit risk associated with the borrower. During underwriting, the system makes automatic assessments of underlying collateral based, in part, on historical data stored in a database concerning the collateral, and recommends either an appraisal with an interior and exterior inspection, an appraisal with an exterior-only inspection or no appraisal. The risk associated with not performing an appraisal is factored into the loan pricing as a per loan adjustment to the interest rate. Also, closing costs may be aggregated with the loan principal. Additionally, the system and process calculate the price that the loan originator may expect to receive in the secondary loan market when it sells an individual loan to the secondary mortgage market purchaser.

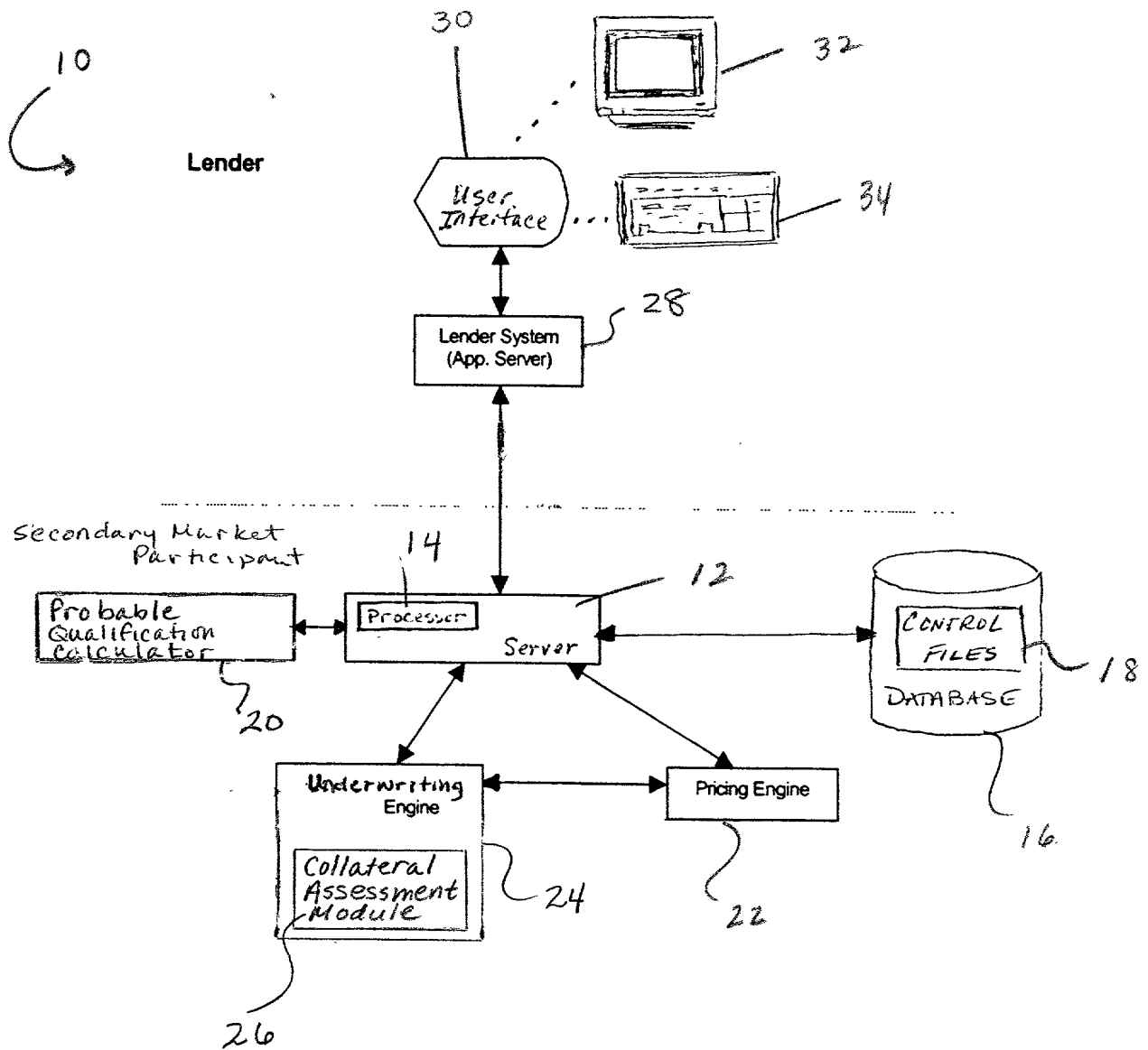
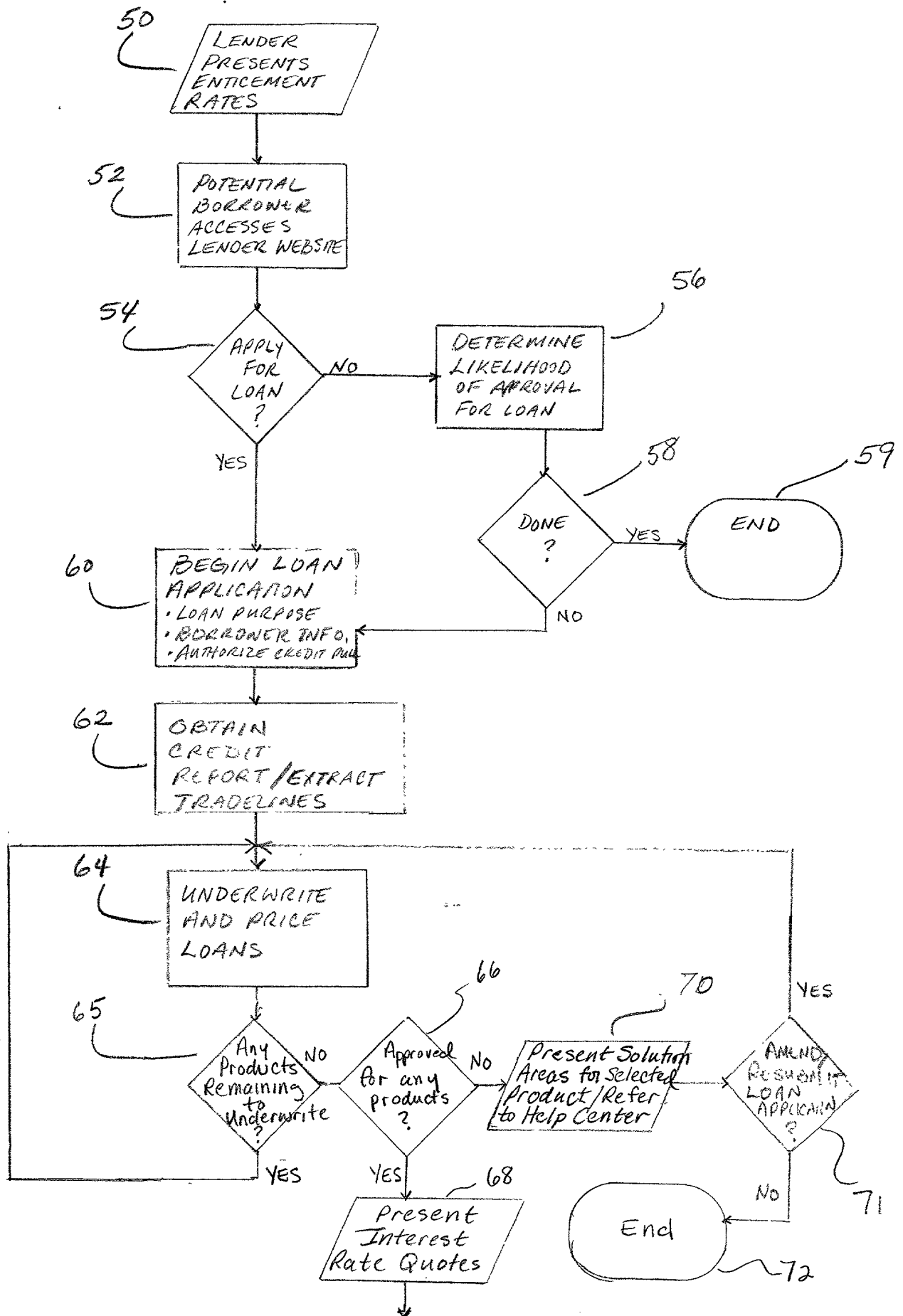


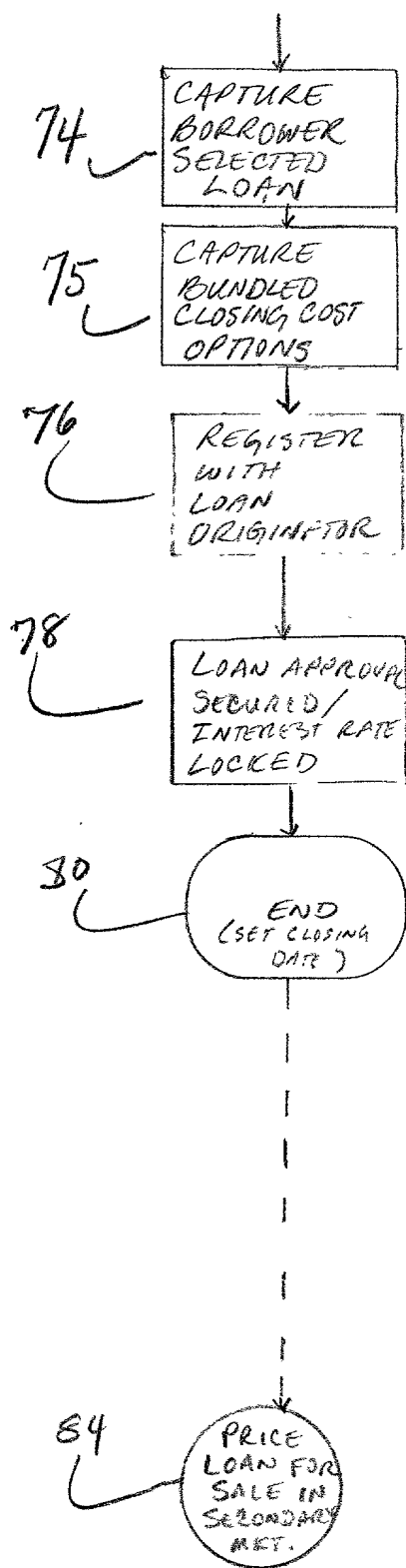
FIG. 1

FIG. 2a



2025 RELEASE UNDER E.O. 14176

1. The first group of people who are not in the labor force are those who are not in the labor force for any reason. This group includes people who are not in the labor force because they are not in the labor force for any reason. This group includes people who are not in the labor force because they are not in the labor force for any reason.



General Product and Pricing (Calculate Enticement Rates)



Capture Application Information: Loan Type and Credit Authorization

Document: Done

doc #19.24

Capture Application Information: Borrower

File Edit View Go Communicator Help

30 Yr. Fixed: | Our 7.20 (APR 7.21) | Theirs 7.25 (APR 7.20) More

STEP 1

You've found a home and are ready to buy

Step 1 of 5: About Yourself

Personal Information

Please provide the following information if it applies to you. If not, leave blank.

First Name	John
Middle Initial	J
Last Name	Smith
Suffix	None (Optional)
Address Line 1	222 main Street
Address Line 2	(optional)
City	Fairfax
State	Virginia
Zip	22031
Home Phone	703 833 5706
The last 4 digits of your Social Security Number	8790

Your Social Security Number is required in order to obtain your personal credit information.

Please make certain the information you have entered is accurate. When you

Document Done

002130774.280

Capture Application Information: Property (Purchase)

File Edit View Go Communicator Help

30 Yr. Fixed | Ours 7.20 (APR 7.21) | Yours 7.25 (APR 7.20) [More](#)

STEP 2

You've found a home and are ready to buy

Step 2 of 5: About the Home You are Planning to Purchase

Home Details

Please provide the following information if it applies to you. If not, leave blank.

I will use the home as: **Primary Residence**

Home Type: **Single Family Detached**

Unit Type: **n/a** If home type is condominium, specify unit type.

Address Line 1:

Address Line 2: Optional

City:

State: **Select State**

Zip Code:

Purchase Price:

Approximate Closing Date: (MM/DD/YYYY)

This date is specified in your purchase and sales contract. We need this date to calculate closing costs.

[GO BACK](#) [SAVE AND CONTINUE LATER](#) [PROCEED TO STEP 3](#)

Document Done

DETSAF09.2000

Capture Application Information: Property (Refinance Transaction)

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location

STEP 2

GET A HOME LOAN

You're ready to refinance.

Step 2 of 5: About the Home You are Planning to Refinance

Home Details

Please provide the following information if it applies to you. If not, leave blank.

(You'll use this information.)

Home Type	Primary Residence
Unit Type	Single Family Detached
Address Line 1	n/a
Address Line 2	1
City	1
State	Maine
Zip Code	11111
Amount Refinancing	\$10,000.00
Property Appraised Value	\$11,111.00
Approximate Closing Date	04/30/2000 (MM/DD/YYYY)

This date is specified in your purchase and sales contract. We need the date to calculate closing costs.

GO BACK SAVE AND CONTINUE LATER PROCEED TO STEP 3

Document Done

000150 719.29

Capture Application Information: Employment and Income

File Edit View Go Communicator Help

You've found a home and are ready to buy

Step 3 of 5: About your Employment and Income

Self Employment

Are you self-employed? ☐ No ☐ Yes

Income for a

Please provide the following information. We will verify this information later to ensure that you can afford your monthly home loan payments.

Gross Salary \$ Annual

Other sources of income that will be used towards purchase of home

Please provide the following information if it applies to you. If not, leave blank.

Bonuses \$ <input type="text"/>	Avg. Annual over past 2 years
Commissions \$ <input type="text"/>	Avg. Annual over past 2 years
Overtime \$ <input type="text"/>	Avg. Annual over past 2 years
Pension/Retirement \$ <input type="text"/>	Monthly
Social Security/Disability \$ <input type="text"/>	Monthly
Dividends and Interest \$ <input type="text"/>	Monthly
Rental Income \$ <input type="text"/>	Monthly
Alimony/Child Support \$ <input type="text"/>	Monthly
Other Income \$ <input type="text"/>	Monthly

Monthly. Leave blank if you don't want it considered for your home loan.

GO BACK TO STEP 2 SAVE AND CONTINUE LATER PROCEED TO STEP 4

Document Done

DET 90 Fig. 2h

Capture Application Information: Assets

File Edit View Go Communicator Help

You've found a home and are ready to buy.

■ Step 4 of 5: About your Assets

Current Cash Value of Assets

Please provide the following information if it applies to you. If not, leave blank. We will verify this information later to ensure that you have enough cash for your down payment and closing costs.

Savings	\$	
Checking	\$	
Gift Money	\$	
Cash Value of Stocks, Mutual Funds, CDs	\$	
Cash Value of 401(k), IRA, Keogh	\$	
Cash from Sale of Property	\$	
Other	\$	
Sales contract deposit	\$	

Leave blank if you are not using cash from sale of home.

The amount of money you already submitted with your purchase and sales contract on the home.

What properties do you own now? If none, click "let's continue"

Please indicate properties that you currently own. Check all that apply. We will verify these properties on your credit report.

<input type="checkbox"/>	Current Residence
<input type="checkbox"/>	Rental Property
<input type="checkbox"/>	Vacation Home
<input type="checkbox"/>	Other

← GO BACK TO STEP 3 SAVE AND CONTINUE LATER LET'S CONTINUE →

Document Done

0001979.20

Capture Application Information: Current Home Loans

File Edit View Go Communicator Help

30 Yr. Fixed: | Our 7.20 (APR 7.21) | Yours 7.25 (APR 7.26) [More](#)

STEP 4

You've found a home and are ready to buy

☒ Step 4 of 5 (cont.): Current Home Loans

Home Loans

Please verify the information below obtained from your credit report.

Date of Home Loan	Monthly Payment	Current Balance	Type of Property
03/15/1992	\$1,075.00	\$9,332.00	<input checked="" type="radio"/> Current Residence
Will this loan be paid off when you close on your new home?			<input type="radio"/> Yes <input checked="" type="radio"/> No
03/15/1992	\$398.00	\$5,242.00	<input checked="" type="radio"/> Rental Property
Will this loan be paid off when you close on your new home?			<input type="radio"/> Yes <input checked="" type="radio"/> No

[GO BACK](#) [SAVE AND CONTINUE LATER](#) [PROCEED TO STEP 5](#)

Document Date

Capture Application Information: Home Loan (Purchase)

File Edit View Go Communicator Help

STEP 5

You've found a home and are ready to buy

■ Step 5 of 5: About the Home Loan You'd Like

Home Loan Details

Loan Type: **30 Year Fixed Rate**

If you have selected an Adjustable Rate Mortgage, please see the ARM@CHRM Disclosure

Help us determine the best loan for your specific needs:

Would you prefer a loan that gives you the:

☒ Lowest monthly payment

☐ Lowest cash required at closing

☐ Compare both options

Purchase Price: \$200,000.00

The amount of money you already submitted with your purchase and sales contract on the home

Sales Contract Deposit: \$0.00

Down Payment: \$0.00 or % rate and monthly payment by putting 20% or more down:

Remaining Down Payment: \$0.00 to be paid at closing

Home Owners Association Dues: \$0.00 If applicable

Closing Costs Paid By Seller: \$0.00 If applicable, this is specified in your purchase and sales contract

Stand up and be counted in our fair lending efforts

To promote our fair lending efforts, the federal government requires us to give you an opportunity to participate in a pre-fair housing survey. Just five questions long. Click YES to participate.

[GO BACK TO STEP 4](#)
[SAVE AND CONTINUE LATER](#)
[LET'S CONTINUE](#)

00E Fig. 2k 550

Capture

Application Information: Home Loan (Refinance transaction)

File Edit View Go Communicator Help

Back Forward Reload Home Search Message Print Security Stop

Bookmarks Location

30 Yr. Fixed: | Our 7.20 (APR 7.21) | Theirs 7.25 (APR 7.20) More

STEP 5

GET A HOME LOAN You're ready to refinance.

Step 5 of 5: About the Home Loan You'd Like

Home Loan Details

Loan Type: 30 Year Fixed Rate

If you have selected an adjustable rate mortgage, please see the ARM/ARM-ARM Disclosure

Help us determine the best loan for your specific needs.

Would you prefer a loan that gives you the

☒ Lowest monthly payment

☐ Lowest cash required at closing

☐ Compare both options

Amount Refinancing: \$10,000.00

Home Owners Association Dues: \$ (if applicable)

Stand up and be counted in our fair lending efforts.

To promote our fair lending efforts, the federal government requires us to give you an opportunity to participate in a brief housing survey, just five questions long. Click YES to participate.

☐ Yes ☐ No

GO BACK TO STEP 4 SAVE AND CONTINUE LATER LET'S CONTINUE

Document Done

006T#013.00TE2510

Capture Application Information: Review (1 of 2)

File Edit View Go Communicator Help

30 Yr. Fixed | Ours 7.20 (APR 7.21) | Theirs 7.25 (APR 7.26) | More

STEP 5

You've found a home and are ready to buy

Step 4 of 5 (cont.): Review Your Personal Information

Personal Information Summary

2 a
1
1

2 Maine 11111
Phone 123-123-1234
Last 4 digits of Social Security Number 1111

Home Details

Single Family Detached
n/a
3

2 Maine 11111
Closing Date 04/30/2000

Income Summary

Summary Monthly Income
Current cash value of assets
Current home loan balances to be paid off at closing
Other outstanding home loan balances

Home Loan Summary

Purchase Price
Loan Type:

\$3,212.56
\$1,234.56
\$1,234.56
\$0.00

\$200,000.00
30 Year Fixed Rate

Document Done

Capture Application Information: Review (2 of 2)

File Edit View Go Communicator Help

Closing Date: 04/30/2000

Income Summary

Summary Monthly Income: \$3,212.58

Current cash value of assets: \$1,234.56

Current home loan balances to be paid off at closing: \$1,234.56

Other outstanding home loan balances: \$0.00

Home Loan Summary

Purchase Price: \$200,000.00

Loan Type: 30 Year Fixed Rate

Sales Contract Deposit: \$0.00

Down Payment: \$0.00

Remaining Down Payment: \$0.00

Home Owner Association Dues: \$0.00

Closing Costs Paid By Seller: \$0.00

GO BACK

SAVE AND CONTINUE LATER

LET'S CONTINUE

Document Done

Capture Application Information: Review (2 of 2)

File Edit View Go Communicator Help

Closing Date: 07/30/2000

Income Summary

Summary Monthly Income

Current cash value of assets:

Current home loan balances to be paid off at closing:

Other outstanding home loan balances

Home Loan Summary

Purchase Price:

Loan Type:

Sales Contract Deposit:

Down Payment:

Remaining Down Payment:

Home Owner Association Dues:

Closing Costs Paid By Seller:

\$3,212.56

\$1,234.56

\$1,234.56

\$0.00

\$200,000.00

30 Year Fixed Rate

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

GO BACK

SAVE AND CONTINUE LATER

LET'S CONTINUE

Document Done

DATE 04/30/2000
FIG. 20

Capture Application Information: Review (2 of 2)

File Edit View Go Communicator Help

Closing Date: 04/30/2000

Income Summary

Summary Monthly Income:	\$3,212.56
Current cash value of assets:	\$1,234.56
Current home loan balances to be paid off at closing:	\$1,234.56
Other outstanding home loan balances:	\$0.00

Home Loan Summary

Purchase Price:	\$200,000.00
Loan Type:	30 Year Fixed Rate
Sales Contract Deposit:	\$0.00
Down Payment:	\$0.00
Remaining Down Payment:	\$0.00
Home Owner Association Dues:	\$0.00
Closing Costs Paid By Seller:	\$0.00

GO BACK SAVE AND CONTINUE LATER LET'S CONTINUE

Document Done

Present Product/Price Combinations: Approval

SAVE AND SHOW ME
OTHER LOAN OPTIONS

000179/9.22

Present Product/Price Combinations: Other Approved Loan Options

File Edit View Go Communicator Help

You've found a home and are ready to buy
Approved Home Loans for \$200,000.00 Loan Amount

You have been approved for the following loans. If you see the loan you want, you may select the loan and continue. If you would like to see a particular loan in more detail, select Show Details. You may compare any two loans side-by-side by checking the boxes next to the desired loans and selecting the Compare button.

30 Year Fixed Rate	Interest Rate	Payment	Points	APR	Select Any Two to Compare
[Show Details] [Want This Loan]	7.846 %	\$1,446.08	\$0.00 0 pts	7.856 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.720 %	\$1,428.08	\$2,000.00 1 pts	7.828 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.595 %	\$1,411.48	\$4,000.00 2 pts	7.701 %	<input type="checkbox"/>

20 Year Fixed Rate	Interest Rate	Payment	Points	APR	Select Any Two to Compare
[Show Details] [Want This Loan]	7.570 %	\$1,819.78	\$0.00 0 pts	7.676 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.445 %	\$1,804.47	\$2,000.00 1 pts	7.546 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.320 %	\$1,789.25	\$4,000.00 2 pts	7.422 %	<input type="checkbox"/>

15 Year Fixed Rate	Interest Rate	Payment	Points	APR	Select Any Two to Compare
[Show Details] [Want This Loan]	7.346 %	\$1,830.45	\$0.00 0 pts	7.448 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.220 %	\$1,822.35	\$2,000.00 1 pts	7.321 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.095 %	\$1,808.10	\$4,000.00 2 pts	7.184 %	<input type="checkbox"/>

10 Year Adjustable Rate	Interest Rate	Payment	Points	APR	Select Any Two to Compare
[Show Details] [Want This Loan]	7.346 %	\$1,830.45	\$0.00 0 pts	7.448 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.220 %	\$1,822.35	\$2,000.00 1 pts	7.321 %	<input type="checkbox"/>
[Show Details] [Want This Loan]	7.095 %	\$1,808.10	\$4,000.00 2 pts	7.184 %	<input type="checkbox"/>

Document Done

I WANT LOAN OPTION 2

Fig. 27

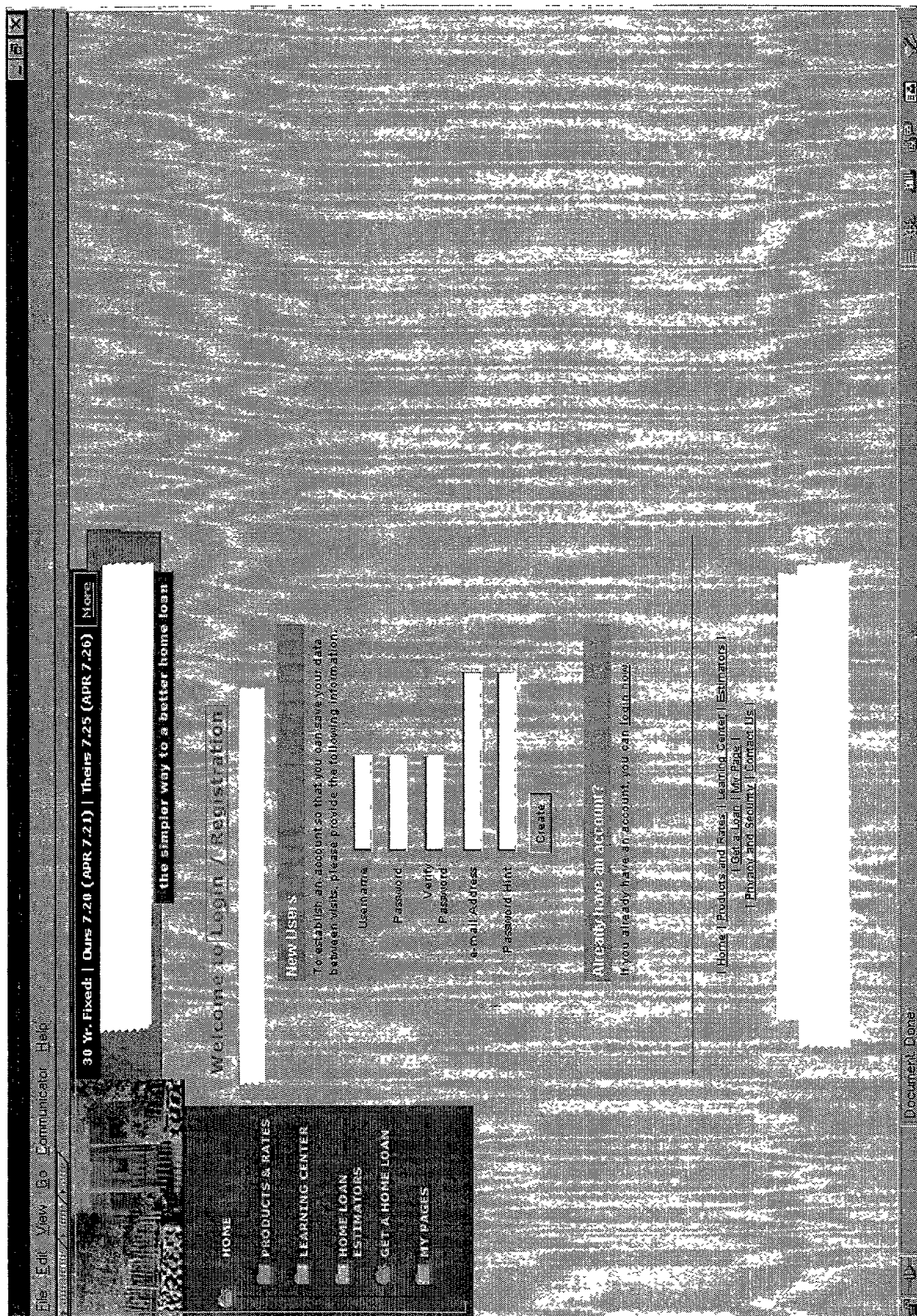


Fig. 2u

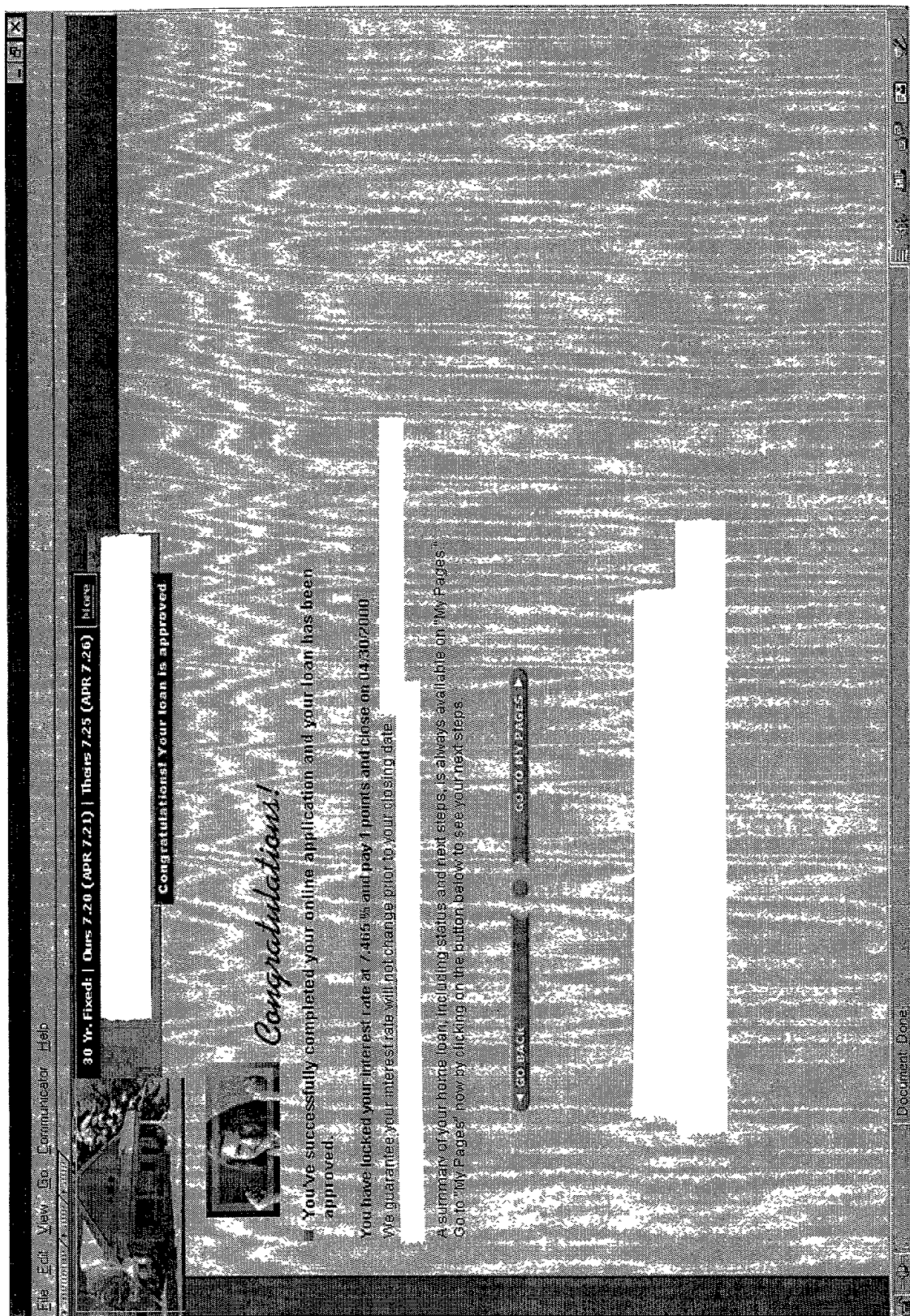


FIG. 3a

20

Take Inputs for Loan Purpose & Borrower Info 100

Loan Purpose 102

Refinance

Purchase 104 b

Take Inputs for Refinance & Home Info 104 a

Take Inputs for Purchase & Home Info

Are all inputs valid? 106 a

Are all inputs valid? 106 b

Set all required fields in instance of ProbableQualCalculator for a Refinance 108 a

Set all required fields in instance of ProbableQualCalculator for a Purchase 108 b

Calculate Eligibility 110 a

Calculate Eligibility 110 b

Is applicant eligible? 112 a

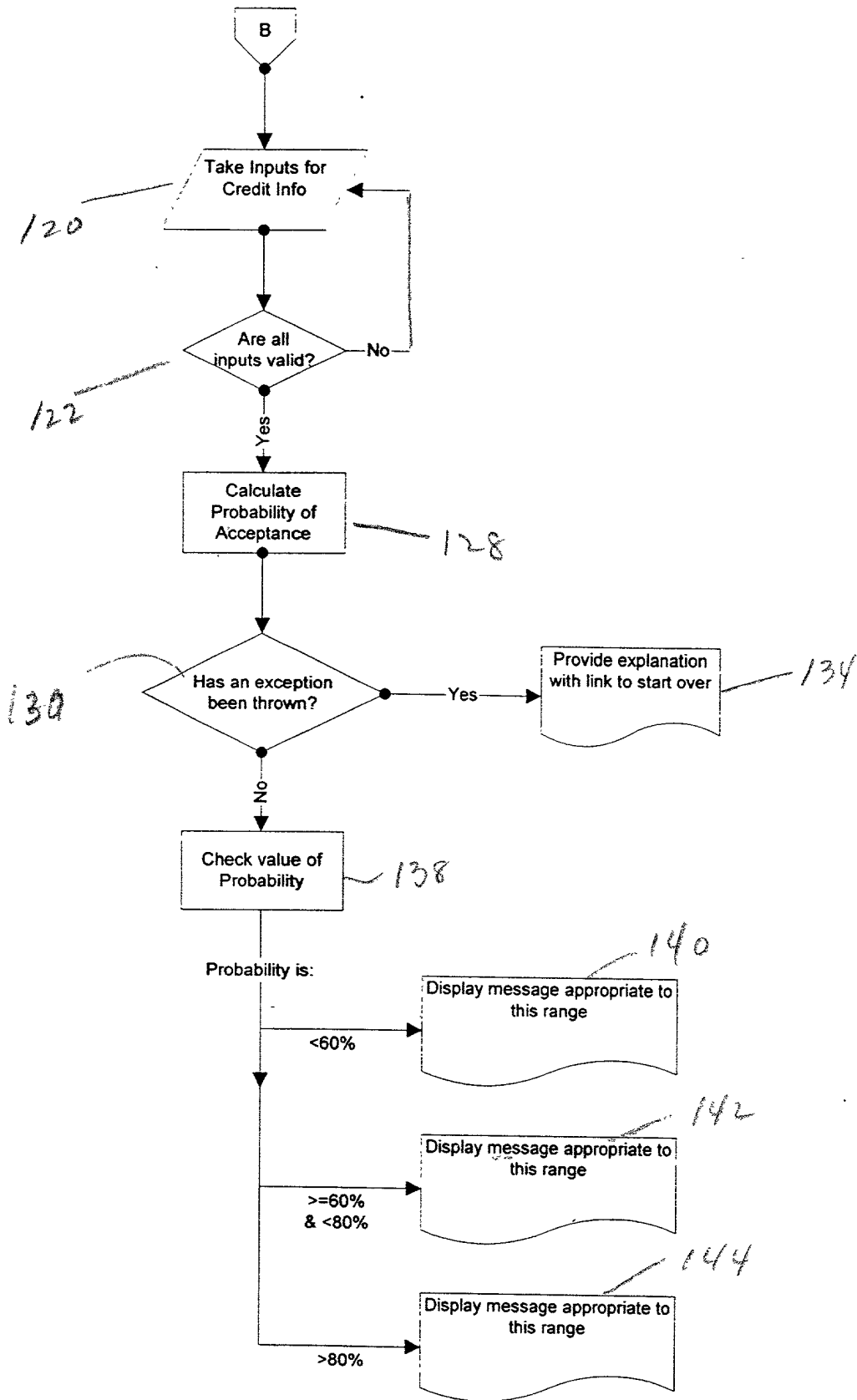
Is applicant eligible? 112 b

Display message showing ineligibility with link to start over 116

B

2025-03-25 10:50:50

FIG. 36



Probable Qual Step 1 of 3

File Edit View Go Communicator Help

Probable Qualification Calculator

■ Step 1 of 3: Your Likelihood of Home Loan Approval

About yourself and any co-borrowers

Your answers should include total combined amounts for yourself and any co-borrowers

Type of home loan:

How many borrowers will be on the home loan application?: ☒ one ☐ two

Annual Income: \$

Are any of the borrowers self-employed?: ☐ Yes ☒ No

Total monthly debt payments not including current home loan or rent payment: \$

Current cash value of assets: \$

[GO BACK](#) [PROCEED TO STEP 2](#)

Document: Done

FIG. 4

Probable Qual Step 2 of 3

File Edit View Go Communicator Help

Probable Qualification Calculator

■ Step 2 of 3: About the Home

Is the property a Condominium: ☐ Yes ☒ No

I will use the home as:

Loan type:

Purchase price: \$

Funds for downpayment and closing: \$

[GO BACK TO STEP 1](#) [PROCEED TO STEP 3](#)

NetScape

FIG. 5

Probable Qual Step 1 of 3

File Edit View Go Communicator Help

Probable Qualification Calculator

■ Step 1 of 3: Your Likelihood of Home Loan Approval

About yourself and any co-borrowers

Your answers should include total combined amounts for yourself and any co-borrowers

Type of home loan:

How many borrowers will be on the home loan application? ☒ one ☐ two

Annual income: \$

Are any of the borrowers self-employed? ☐ Yes ☒ No

Total monthly debt payments not including current home loan or rent payment: \$

Current cash value of assets: \$

GO BACK TO STEP 1 PROCEED TO STEP 2

Document Done

FIG. 6

Probable Qual Step 2 of 3

File Edit View Go Communicator Help

Probable Qualification Calculator

■ Step 2 of 3: About the Home

Is the property a Condominium? ☐ Yes ☒ No

I will use the home as:

Loan type:

What is your current mortgage balance?: \$

What is the current value of the property?: \$

What is the loan Amount?: \$

Interest Rate:

GO BACK TO STEP 1 PROCEED TO STEP 3

Document Done

FIG. 7

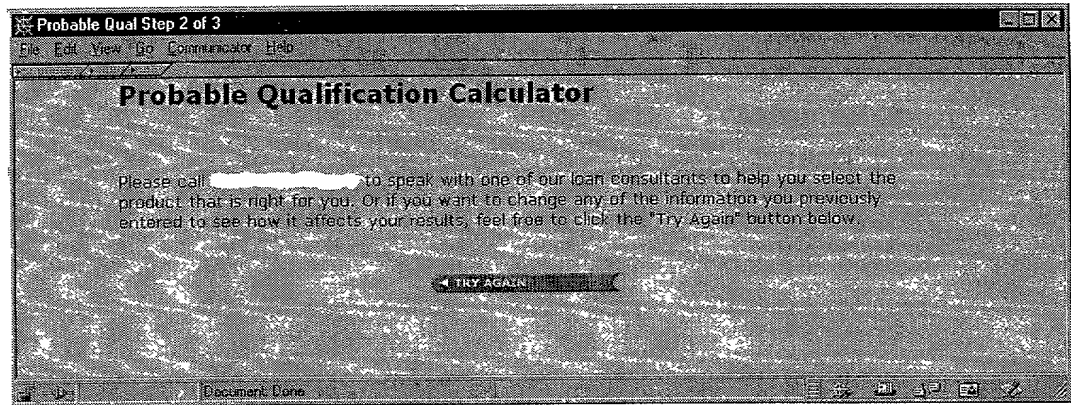


FIG. 8

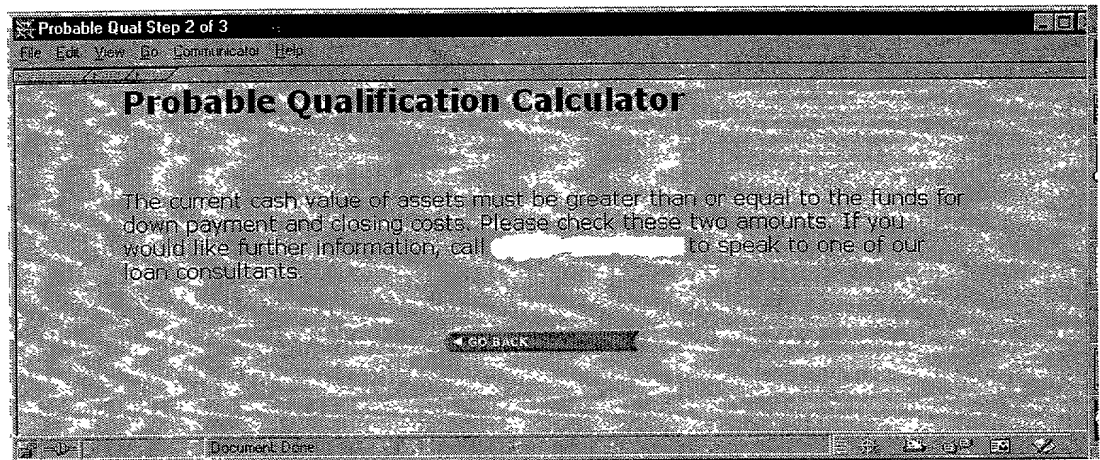


FIG. 9

Probable Qual Step 3 of 3

File Edit View Go Communicator Help

Probable Qualification Calculator

■ Step 3 of 3: About your use of Personal Credit

What if I have credit problems?

We have special programs for people with less-than-perfect credit. We will work with you to come up with the right home loan solution to meet your needs.

When answering, think of yourself and ANY co-borrowers.

During the past 10 years have you filed for bankruptcy, had a home foreclosed, had a tax lien filed against you, or had your income garnished by a creditor?

☐ Yes ☒ No

When did you open your very first credit account?

Greater than 5 up to 10 yrs ago

☒ Fewer than 5

How many new credit accounts have you opened in the past 2 years?

☐ 5 or more

When was the last time you were more than a month late on a credit account payment?

Never delinquent

How many times during the last 7 years have you been more than one month late on a credit account payment?

0

What is the approximate total dollar amount of your current borrowing power? (i.e. sum of credit limits on all credit cards)

\$ 10,001 - 20,000

What is the approximate total dollar amount of money you have currently borrowed? This is the sum of all your outstanding credit card balances.

\$ 3,501 - 10,000

GO BACK TO STEP 2 SEE RESULTS

Document: Done

Fig. 10

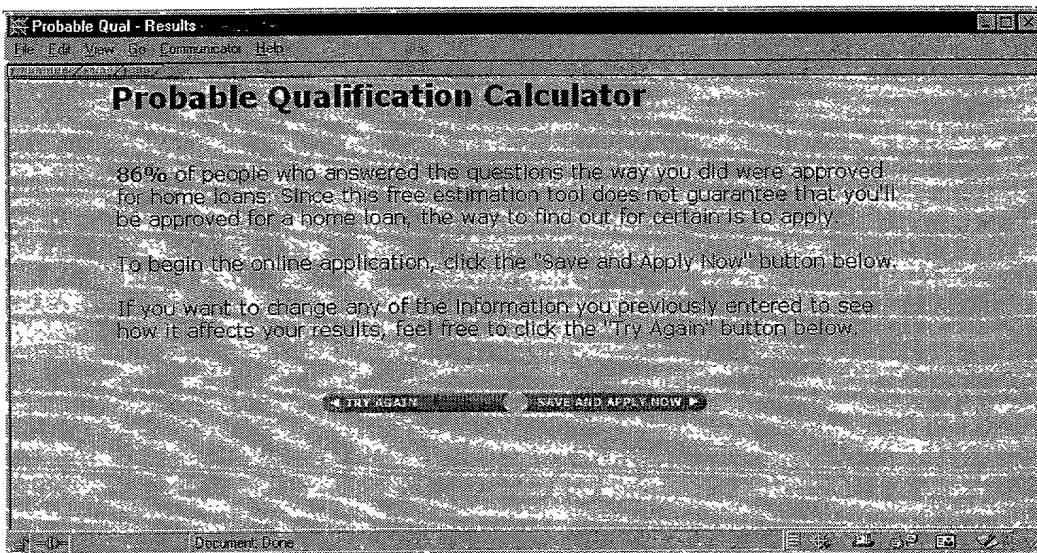


FIG. 11

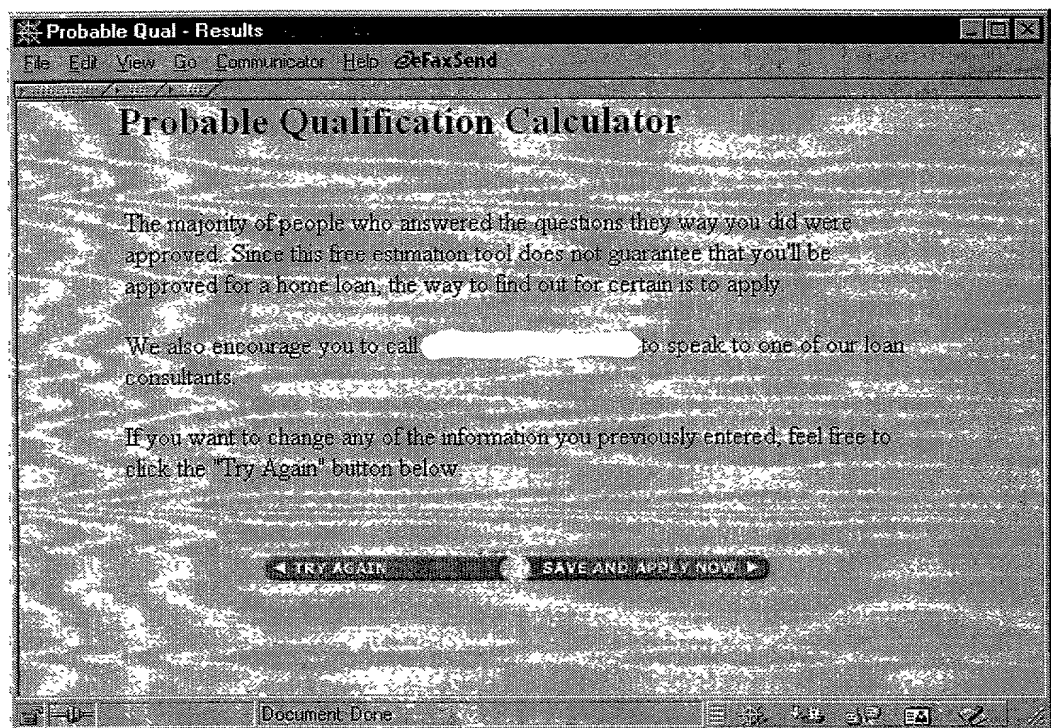


FIG. 12

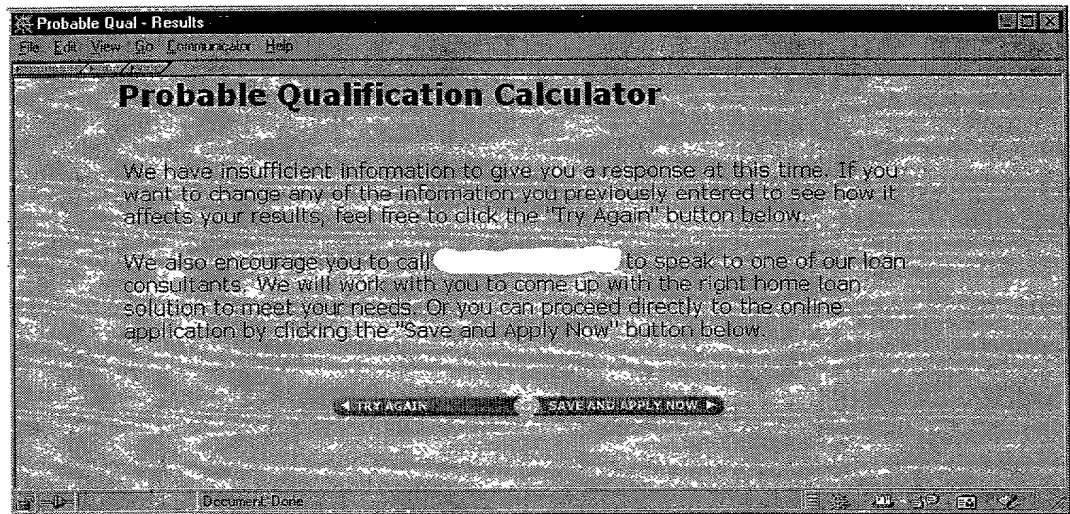


FIG. 13

FIG. 14a

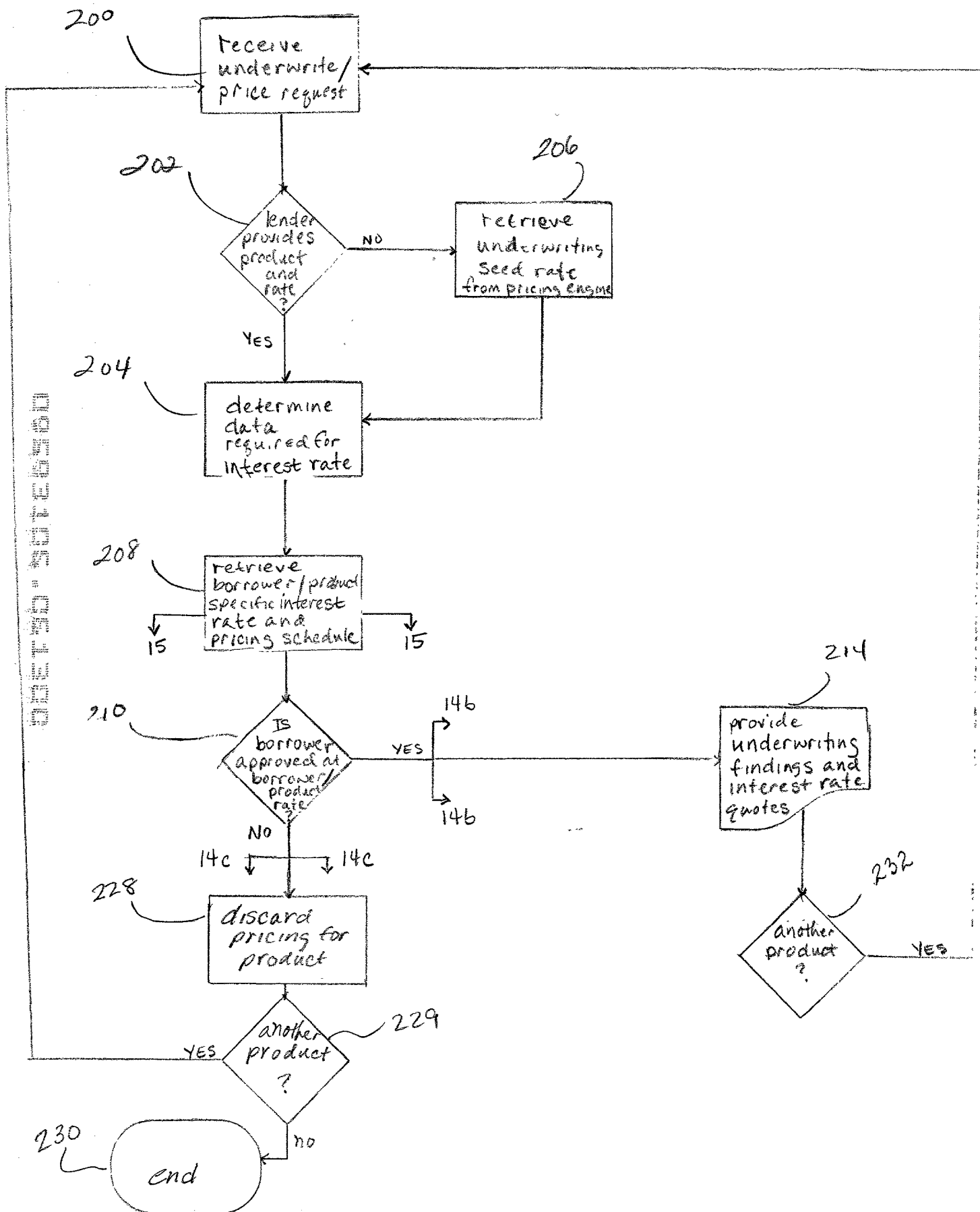


FIG. 14b

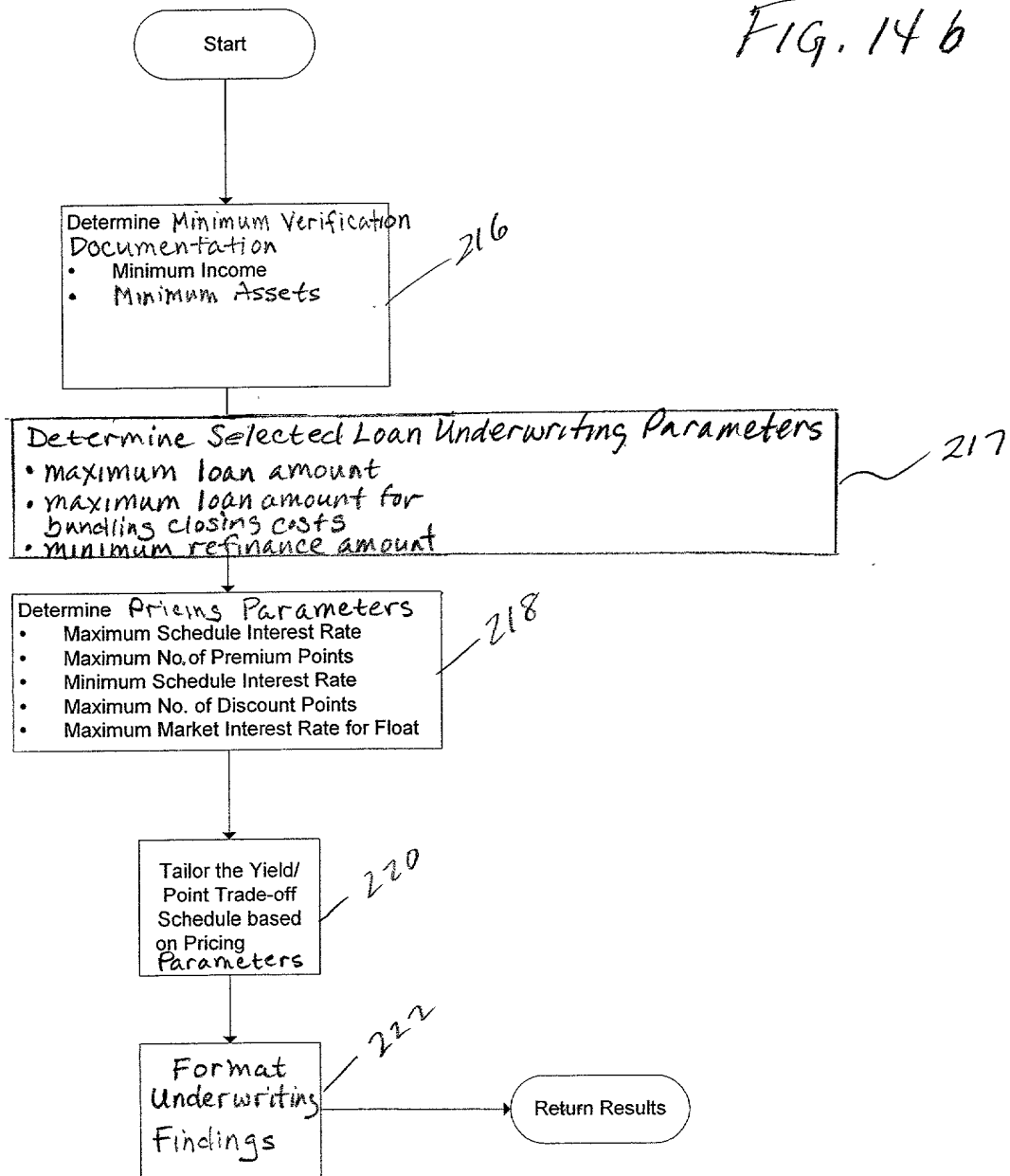


FIG. 14C

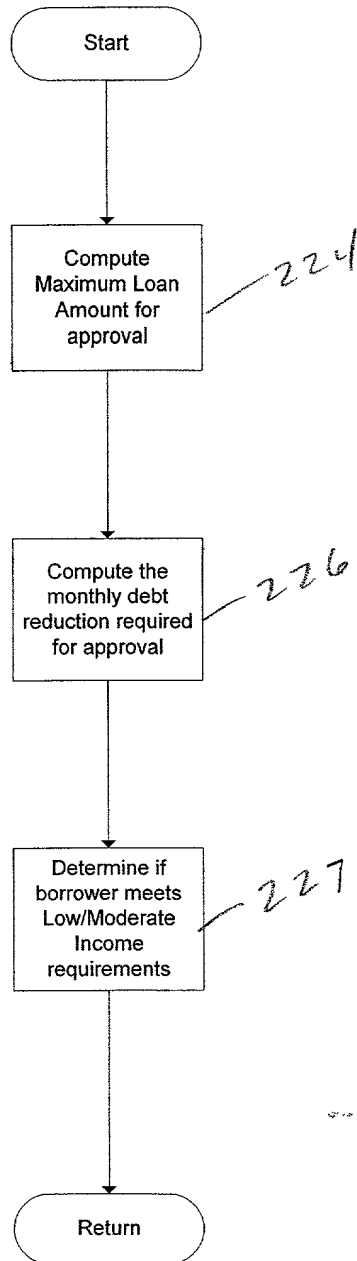


FIG. 15

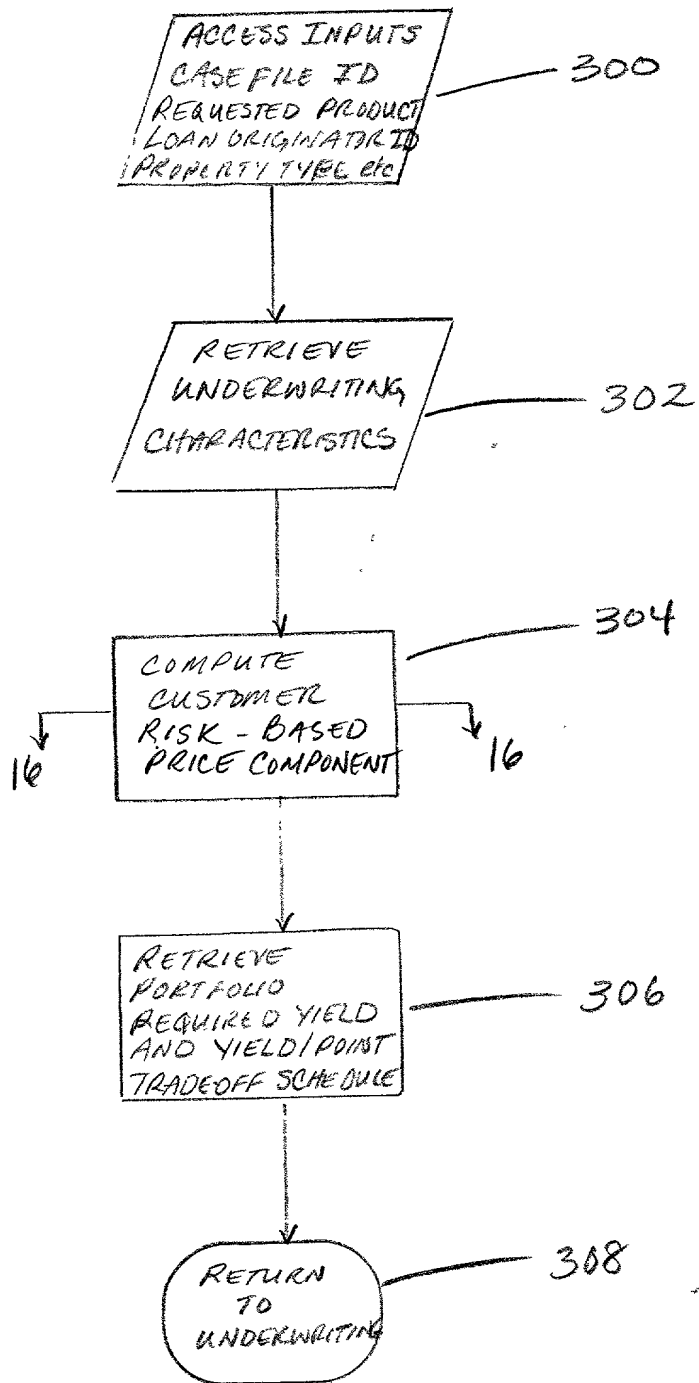


FIG. 16

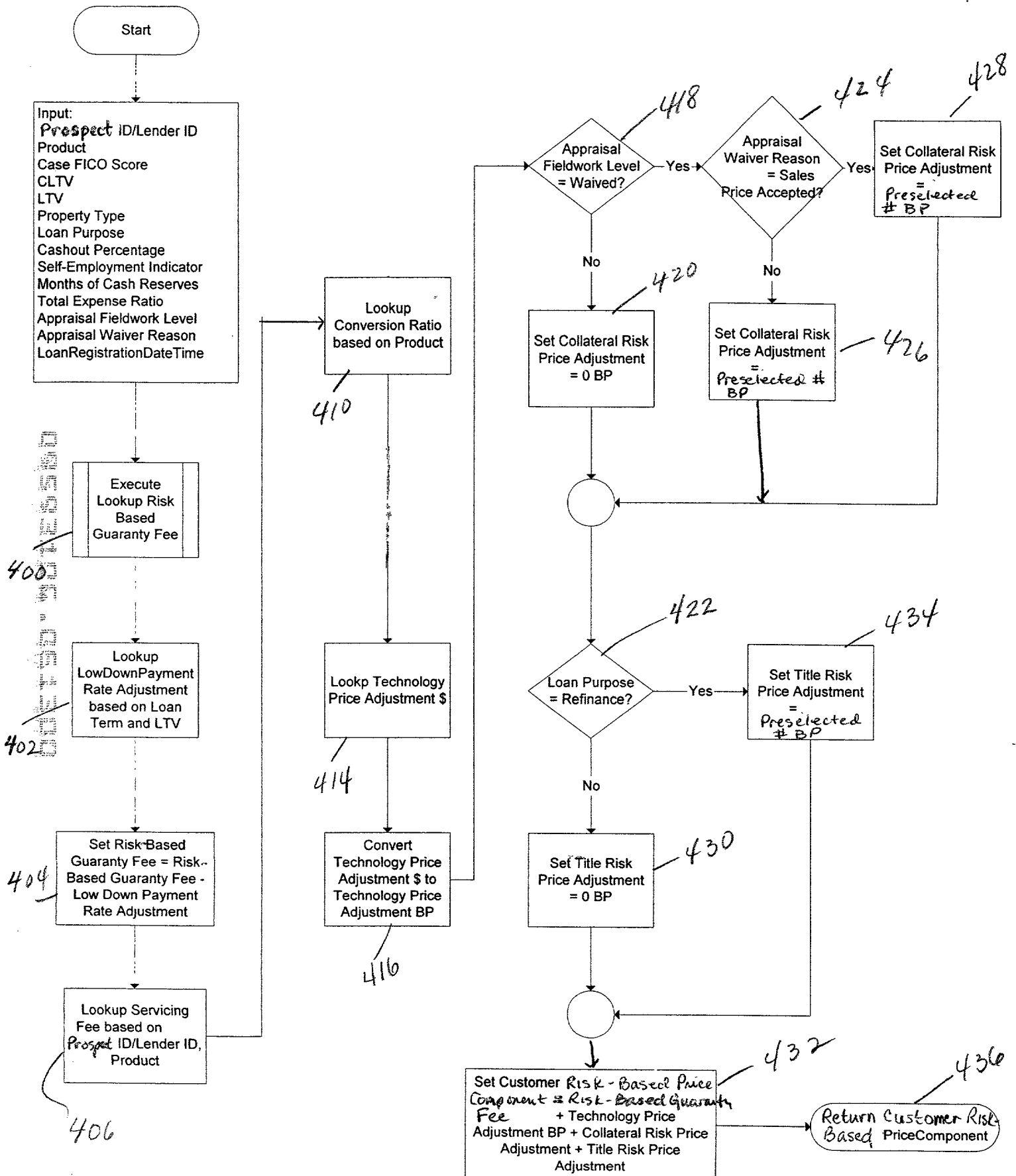


FIG. 17

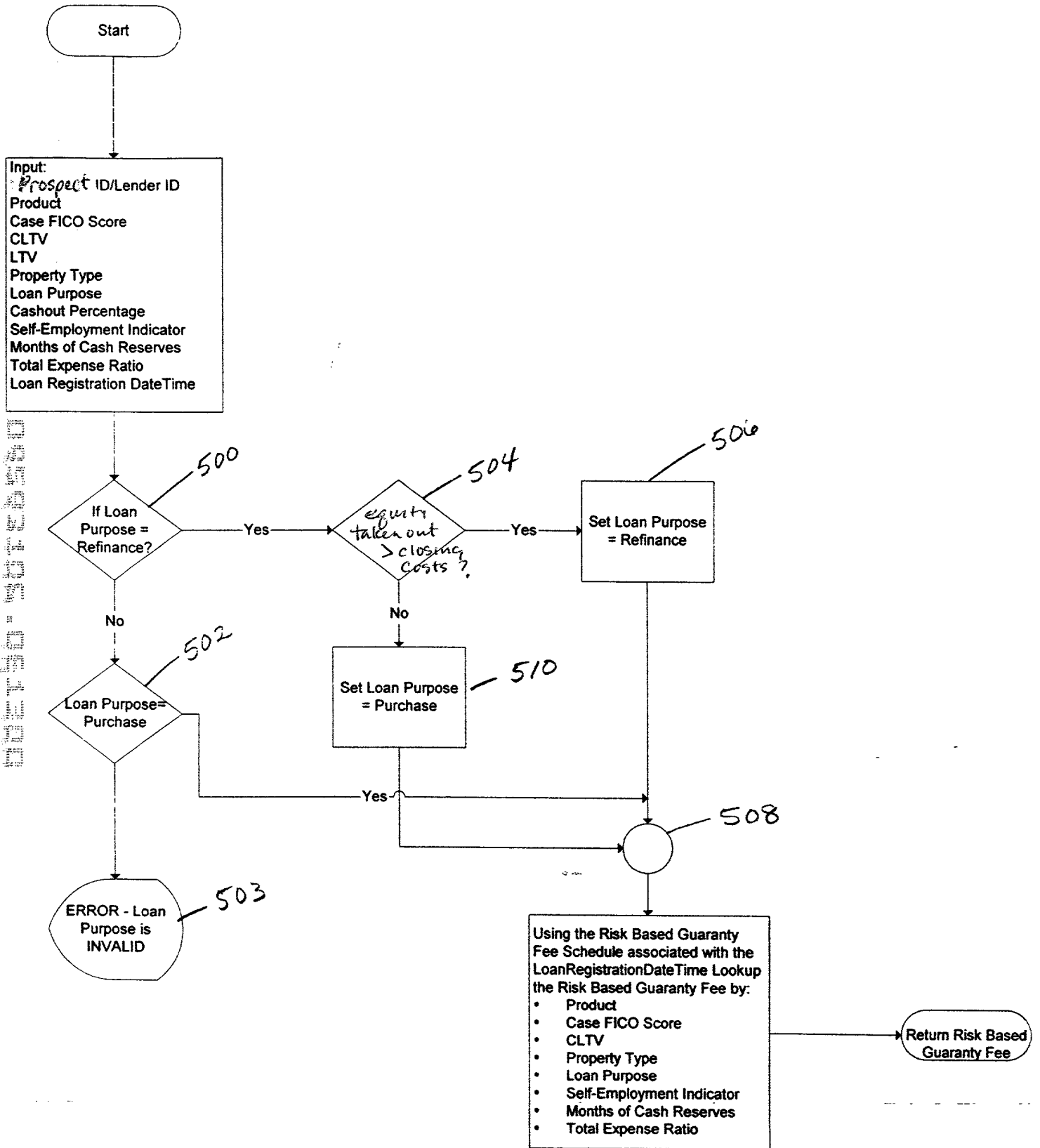


FIG. 18a

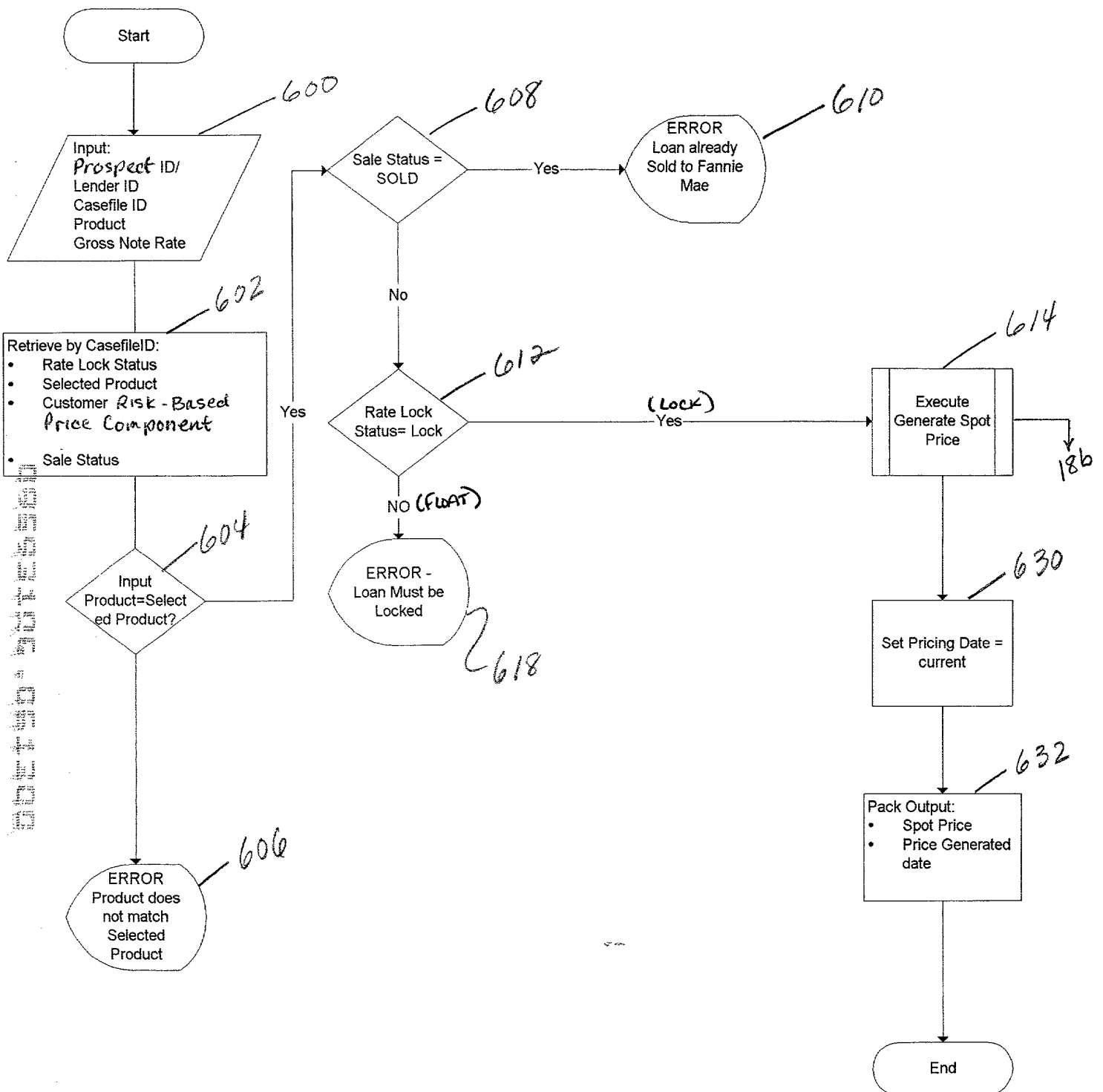
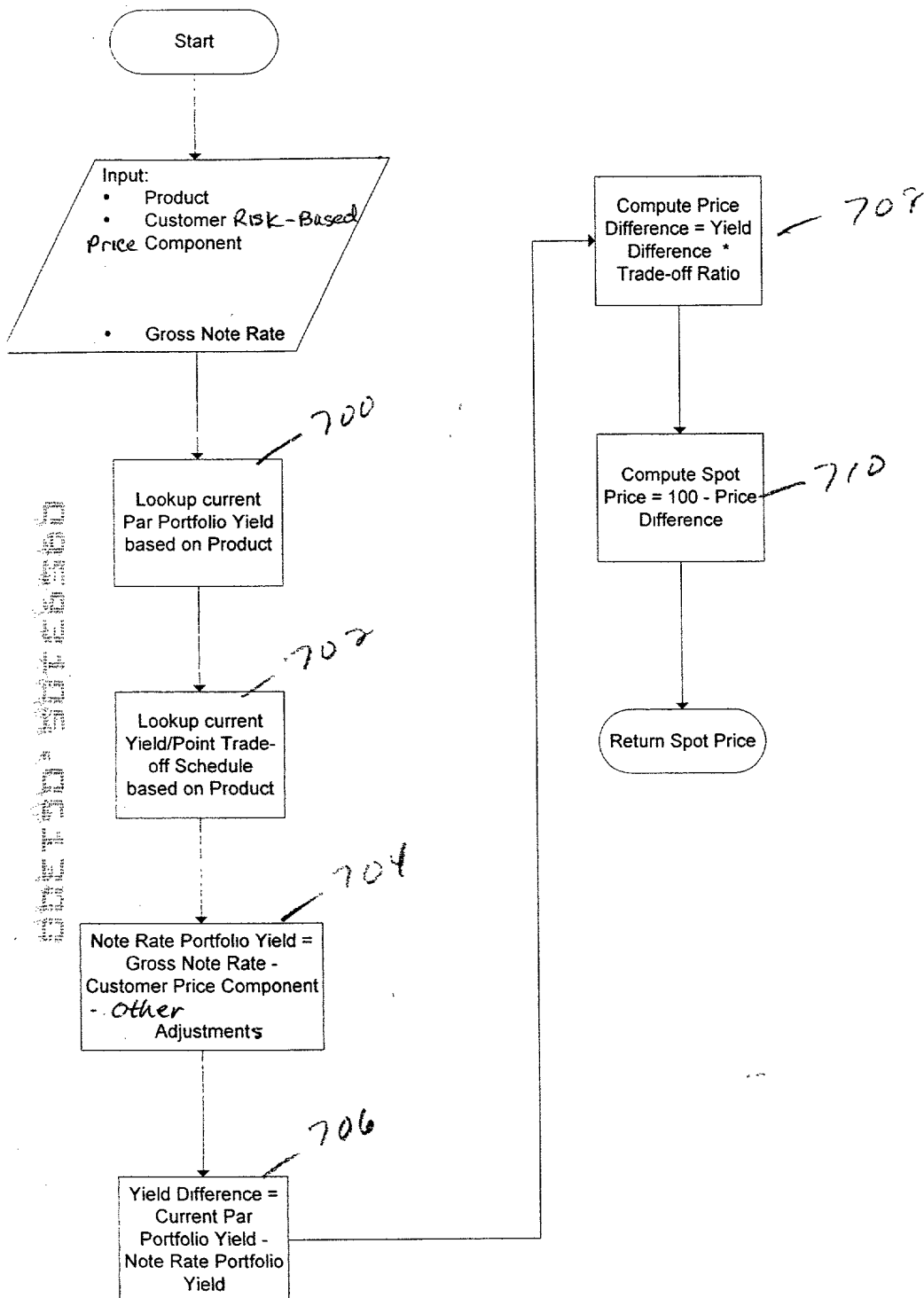


Fig. 186



DECLARATION, POWER OF ATTORNEY AND PETITION

As a below named inventor, I hereby declare that:

My residence, citizenship and post office address are as stated below next to my name and signature.

This declaration is of the following type: (check one) ☒ original; ☐ design; ☐ supplemental; ☐ national stage of PCT or ☐ divisional, continuation or continuation-in-part.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if multiple names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**ONLINE MORTGAGE QUALIFICATION AND APPLICATION
SYSTEM AND PROCESS**

the specification of which: (check one) ☒ is attached hereto; ☐ was filed on _____, as Application Serial No. _____ and is/was amended on _____ (if applicable) or ☐ was described and claimed in PCT International Application No. _____, filed on _____ as amended under PCT Article 19 on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby identify below, and where indicated claim foreign priority benefits under Title 35, United States Code §§ 119(a)-(d) or §§ 365(a)-(b) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America, filed within 12 months (6 months for design) prior to this application, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) on which priority is claimed (if any):

Prior Foreign/PCT Application(s)			Priority claimed	
(Number)	(Country)	Day/month/year filed	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes	<input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below (if any):

Provisional Application Number	Filing Date
--------------------------------	-------------

Provisional Application Number	Filing Date
--------------------------------	-------------

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT International Application designating the United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing date)	(patent, pending, abandoned)
--------------------------	---------------	------------------------------

(Application Serial No.)	(Filing date)	(patent, pending, abandoned)
--------------------------	---------------	------------------------------

(Application Serial No.)	(Filing date)	(patent, pending, abandoned)
--------------------------	---------------	------------------------------

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint the following practitioner(s): **Randy Lipsitz, Reg. No. 29,189; Philip A. Gilman, Reg. No. 38,160; Richard L. Moss, Reg. No. 39,782; John C. Garces, Reg. No. 40,616; Nicholas L. Coch, Reg. No. 20,065; Peter A. Abruzzese, Reg. No. 26,437; Donald L. Rhoads, Reg. No. 34,705; Chris Kolefas, Reg. No. 35,226; Vito J. Debari, Reg. No. 36,496; Caleb S. Pollack, Reg. No. 37,912; Jonathan S. Caplan, Reg. No. 38,094, Albert B. Chen; Reg. No. 41,667 and Robert E. Alderson, Jr., Reg. No. 44,500** whose correspondence address is:

Kramer Levin Naftalis & Frankel LLP
919 Third Avenue
New York, New York 10022

Direct telephone calls to Kramer Levin Naftalis & Frankel LLP:
(212) 715-9100

as my attorneys with full powers of substitution and revocation, to prosecute this application and to transmit all business in the Patent and Trademark Office connected therewith. Please send all correspondence to the above correspondence address.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

Full name of sole or first inventor: Michael J. Williams
Inventor's signature: _____ Date: _____
Residence: 12021 Great Elm Drive, Potomac, MD 20854
Citizenship: United States
Post Office Address: 12021 Great Elm Drive, Potomac, MD 20854

Full name of second joint inventor: David N. Voth
Inventor's signature: _____ Date: _____
Residence: 11812 Lyrac Court, Oakton, VA 22124
Citizenship: United States
Post Office Address: 11812 Lyrac Court, Oakton, VA 22124

Full name of additional joint inventor: Kimberly J. Hirsch
Inventor's signature: _____ Date: _____
Residence: 1832 Post Oak Trail, Reston, VA 20191
Citizenship: United States
Post Office Address: 1832 Post Oak Trail, Reston, VA 20191

Full name of additional joint inventor: Michael W. Koch
Inventor's signature: _____ Date: _____
Residence: 1363 Brenneman Road, Bittinger, MD 21522
Citizenship: United States
Post Office Address: 1363 Brenneman Road, Bittinger, MD 21522

Full name of additional joint inventor: Peter G. Kopperman
Inventor's signature: _____ Date: _____
Residence: 8006 Greentree Road, Bethesda, MD 20817
Citizenship: United States
Post Office Address: 8006 Greentree Road, Bethesda, MD 20817

Sheets containing additional joint inventors (*check one*) ☒ are, ☐ are not attached hereto.

Full name of additional joint inventor: **Richard N. Plotnick**
Inventor's signature: _____ Date: _____
Residence: 9205 Christopher Street, Fairfax, VA 22031
Citizenship: United States
Post Office Address: 9205 Christopher Street, Fairfax, VA 22031

Full name of additional joint inventor: **Martin T. Schulz**
Inventor's signature: _____ Date: _____
Residence: 1705 Macon Street, McLean, VA 22101
Citizenship: United States
Post Office Address: 1705 Macon Street, McLean, VA 22101

Full name of additional joint inventor: **Peter A. Simon**
Inventor's signature: _____ Date: _____
Residence: 3619 Fessenden Street, NW, Washington, DC 20008
Citizenship: United States
Post Office Address: 3619 Fessenden Street, NW, Washington, DC 20008